West Coast Vancouver Island Groundfish Bottom Trawl Survey, R/V WE RICKER, May 23rd to June 19th, 2006

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ABSTRACT

Workman G.D., Olsen, N., Fargo, J., and Stanley, R.D. 2008. West coast Vancouver Island groundfish bottom trawl survey, R/V WE RICKER, May 23rd to June 19th, 2006. Can. Manuscr. Rep. Fish. Aquat. Sci.2841: viii + 83 p.

A bottom trawl survey of the west coast of Vancouver Island was conducted on the fisheries research vessel WE RICKER between May 23rd and June 19th, 2006. The survey was jointly conducted and funded by the Canadian Groundfish Research and Conservation Society (CGRCS) and Fisheries and Oceans Canada (DFO). It was the second in what is intended to be a long-term survey series, coordinated with other area-specific surveys that together cover the continental shelf and upper slope of most of the British Columbia coast. The objective of these surveys is to provide fishery-independent abundance indices of all demersal fish species available to bottom trawling, as well as to collect biological samples of selected species.

The survey conducted 165 successful tows from a selected set of 252 potential survey blocks. The mean catch per successful tow was 710 kg, averaging about 19 different species of fish and invertebrates in each. The most abundant fish species encountered were spiny dogfish, arrowtooth flounder, canary rockfish, Pacific ocean perch, yellowtail rockfish, sablefish, splitnose rockfish, Dover sole, and sharpchin rockfish. Biological data, including individual length, weight, sex, maturity, and age structure, were collected from 60 species of fish. Oceanographic data and net geometry were also recorded for most tows, including water temperature, depth, headrope height, and door spread. For the first time a Seabird SBE 16 + CTD was mounted on the net and logged temperature, depth, salinity and dissolved oxygen levels in situ during most tows. CTD casts were performed at 91 "La Perouse Project" sampling stations. Sea surface temperature and salinity was also collected throughout the survey.

RÉSUMÉ

Workman G.D., Olsen, N., Fargo, J., and Stanley, R.D. 2008. West coast Vancouver Island groundfish bottom trawl survey, R/V WE RICKER, May 23rd to June 19th, 2006. Can. Manuscr. Rep. Fish. Aquat. Sci.2841: viii + 83 p.

Un relevé au chalut de fond de la côte ouest de l'île de Vancouver a été réalisé à partir du navire de recherche halieutique NGCC W.E. RICKER du 23 mai au 19 juin 2006. Le relevé a été effecué et financé conjointement par la Canadian Groundfish Research and Conservation Society (CGRCS) et Pêches et Océans Canada (MPO). Il s'agit du deuxième relevé d'une série de relevés à long terme et qui sont coordonnés avec d'autres échantillonnages par secteur couvrant, ensemble, le plateau continental et la partie supérieure du talus de la majeure partie de la côte de la Colombie-Britannique. L'objectif de ces échantillonnages est d'établir des indices d'abondance, indépendants de la pêche, de toutes les espèces de poissons démersaux capturables au chalut de fond et de recueillir des données biologiques sur les espèces sélectionnées.

Des 252 blocs potentiels de relevés, 165 traits de chalut ont été fructueux. Les prises moyennes par trait de chalut réalisé se chiffraient à 710 kg. Quelque 19 espèces de poissons et d'invertébrés ont été prises en moyenne à chaque trait. L'aiguillat commun, la plie à grande bouche, le sébaste canari, le sébaste du Pacifique, le sébaste à queue jaune, la morue charbonnière, le bec-de-lièvre, la sole à petite bouche et le sébaste à menton pointu étaient les espèces les plus abondantes. Des données biologiques (longueur, poids, sexe, stade de maturité et structure d'âge) ont été recueillies pour 60 espèces de poisson. Des données océanographiques et des données sur la géométrie du chalut (température de l'eau, profondeur, hauteur de la ralingue supérieure et écartement des panneaux) ont également été recueillies pour la plupart des traits. Pour la première fois, une sonde CTD Seabird SBE 16 + a été installée sur le chalut et a permis de consigner in situ différentes données (température, profondeur, salinité et concentration d'oxygène dissous) pour presque tous les traits. Des mouillages de sonde CTD ont été effectués à 91 stations d'échantillonnage du Projet La Pérouse. La température et la salinité de la surface de la mer ont également été recueillis tout au long du relevé.

INTRODUCTION

The West Coast of Vancouver Island (WCVI, Figure 1) is a major contributor to the Canadian west coast bottom trawl groundfish fishery with around 6000 – 9000 metric tonnes of mixed groundfish being landed from this area annually. Table 1 lists average annual catches comprising 95 % of the bottom trawl catch from the WCVI by species between 1996 and 2005. Species for which this area contributes significantly to coast wide catches are longspine and shortspine thornyheads (*Sebastolobus altivelis and Seb. alascanus*); Dover and petrale sole (*Microstomus pacificus and Eopsetta jordani*); canary, yellowtail and bocaccio rockfishes (*Sebastes pinniger, S. flavidus and S. paucispinis*); lingcod (*Ophiodon elongatus*) and spiny dogfish (*Squalus acanthias*).

Sinclair et al., (2003) recommended the development of fishery independent relative abundance indices using random depth stratified bottom trawl surveys for the entire BC coast. Based on that recommendation a survey was conducted in the summer of 2003 in Queen Charlotte Sound (Olsen et al., 2007a); based on the success of that survey a "**Survey Strategy**" was developed to provide bottom trawl survey coverage for most of the trawlable bottom on the BC coast. As part of the strategy the Department of Fisheries and Oceans (DFO) conducted the first of what is intended to be a continuous series of biennial surveys of the WCVI in 2004 (Workman et al., 2008) . Prior to that survey the most recent historic surveys were in 1996 (Olsen et al., 1997), and 1985 (Leaman et al., 1988). The US National Marine Fisheries Service (NMFS) surveyed the lower west coast of Vancouver Island as part of their triennial bottom trawl survey between 1977 and 2001.

Objectives of the survey were to collect detailed distributional and abundance data for all species available to bottom trawl gear; collect detailed biological data for selected species; collect environmental data at Established "La Perouse Project" time series CTD stations; incorporate a new net mounted CTD into the survey; and improve automated data logging systems.

This report is not intended to provide a comprehensive analysis of the data collected during the survey but rather to serve as an instrument to document procedures, provide general results and capture meta-data from the survey. Detailed analyses of the biological and catch data collected during the survey will be the subject of separate reports.

METHODS

VESSEL

The CCGS WE RICKER (Figure 2) is a 58 m, 413 tonne, steel stern trawler with 2500 hp. It is equipped with two 15 tonne trawl winches each carrying 800 m of 28 mm fiber core main trawl warp. For a complete description of the WE RICKER go to the Canadian Coast Guard Web site at: **http://www.pacific.ccg-gcc.gc.ca/fleet-flotte/fleetinfo/wericker_e.htm**

NET AND RIGGING

In an effort to standardize survey gear two new Atlantic Western IIa "box trawls" were fabricated in the spring of 2006. These nets are nearly identical in design to the nets

used during multispecies groundfish surveys between 2003 and 2005 (Olsen et al., 2007a, b, c, Workman et al, 2008, Workman et al, in prep). The two nets used previously had slight differences in materials and footrope construction which were eliminated in construction of the new nets. Differences in the older nets included the use of combination wire instead of chain for winglines, the use of corkline instead of combination rope for the headrope, the use of chain instead of poly rope for the foot rope and the size of chain used for the bolchline, and fishing line.

This net design was recommended by commercial fishermen as a reliable general purpose net suitable for survey work due to its durability and ease of repair. Two trawls were purchased by the Canadian Groundfish Research and Conservation society (CGRCS) a third net was purchased by the DFO in the spring of 2006. Details of net construction and rigging are listed in Table 2 and shown in Figure 3. In the event of net damage the crew was required to repair the net to its original specification before putting it back into service, broken mesh had to be repaired between tows and any missing web had to be replaced with new.

TRAWL MONITORING

SIMRAD ITI net mensuration gear was used to measure door spread, wingtip spread, headrope height, depth and temperature during most trawl sets. The ITI system consists of sensors that are attached at various locations on the net, a ram-mounted transducer that receives signals from the sensors via an acoustic link, and a deck unit that processes and displays data from the sensors. Sensor data were also recorded manually by the chief scientist on supplemental bridge log forms. Unlike the pilot WCVI survey in 2004 the Furuno FS20 Net sonar was not used during this survey due to concerns over its impact on catch rates for some species.

TRAWL MOUNTED SCIENTIFIC PROBES

A Mac Marine (NMFS) bottom contact sensor (BCS) recorded net contact with the bottom at six second intervals. This device consists of a digital inclinometer, and a data logger enclosed in a heavy stainless steel housing. The sensor is hung off the foot rope on a short chain bridle and measures tilt angle with an angle of 90 degrees indicating the device is vertical and an angle of 0 degrees indicating horizontal.

A SeaBird Electronics SBE 39 temperature and depth recorder was attached to the head-rope of the net and logged temperature and depth at 10-second intervals throughout the day. The SBE 39 was mounted in a two-inch PVC pipe housings for protection and attached to the head-rope using chain and karabiners

A SeaBird Electronic SBE 16Plus CTD was also attached to the headrope of the net. It was configured to record depth, temperature, conductivity and dissolved oxygen at 10 second intervals throughout the each tow. The probe was configured to remain in quiescent state until the salinity cell recorded a voltage indicating it was submerged in salt water, it then turned on the pump for the conductivity and oxygen sensors and started logging data. To protect the CTD it was mounted in a section of 20 cm diameter PVC pipe (housing) using stainless steel band clamps. The housing was then sewn to the top square of the net in a mesh bag; a chain knot was used at the front end of the bag to allow the CTD to be removed from the net between tows.

SURVEY DESIGN

The survey area encompasses the west coast of Vancouver Island from the Canada/US border in the south to Quatsino Sound in the north (Figure 4). The survey did not cover the area north of Topknot Island due to the scarcity of trawlable bottom. Depths surveyed ranged from 50 – 500 m; the depth stratification scheme was the same as that used in 2004 (Table 3). The survey frame did not include inlets or enclosed waters. The overall survey surface area (50-500 m) is about 12,918 km^2.

An analysis conducted prior to the 2004 survey determined that 180-190 tows would be required to generate high precision indices (RE < 0.2) for 20 or more species. Results of the 2004 "pilot" survey supported this recommendation with only 5 species achieving the target RE with 90 usable tows. With a full ship's cycle of 28 days we estimated that between 170 and 180 usable tows could be completed in the available time.

BLOCK SELECTION AND SURVEY MANAGEMENT

Initially a grid of 4 km^2 (2 km x 2 km) blocks was superimposed on a digital bathymetric model of the survey area. The average depth was computed for each block and stratum membership assigned. Blocks were then selected at random within strata based on the allocation scheme. Blocks that fell within rockfish conservation areas (RCAs) or enclosed waters, were eliminated from the initial set. A geographic information system (GIS, ArcMap 9.0) was used to design and then manage the survey.

Adopting the strategy developed for the Queen Charlotte Sound survey in 2005 a complete set of potential survey blocks was selected prior to departure (Olsen et al, 2007c). Based on the observed rejection or failure rate of 28 % observed during the 2004 survey of this area we estimated that approximately 252 randomly selected blocks would be need to achieve the target of 170 – 180 usable tows.

FISHING OPERATIONS

Fishing operations were the same as those described by Workman et al., 2007. Fishing commenced at 07:00 and ended around 20:00, this was in accordance with the vessels lay-day schedule. Catch processing and biological sampling often continued for several hours afterwards resulting in an average 14 hour work day for the science crew aboard the vessel.

Each evening, the fishing master and chief scientist would review a map of the remaining blocks and select a subset to examine the following day. Sets of blocks were selected to minimize run time between locations, mix anticipated catch levels throughout the day, and end near a CTD station. If in the opinion of the fishing master or a consultant fisherman a block was un-fishable it was rejected.

If a selected block was known to be fishable by either the fishing master or consultant fisherman fishing commenced immediately upon arrival at the location. If unfamiliar to either, the block was inspected for half and hour to an hour using the depth sounder. If no tow location could be found, the block was rejected and the vessel moved on to the next block.

Target tow duration was 20 minutes on bottom. Start and end times were determined by monitoring the net mensuration sensor outputs. Once the head rope height

had collapsed to 3-4 m we concluded that the gear had "settled", was fishing, and started the tow timer. After 19 minutes the fishing master was directed to start retrieving the net, due to "lift off lag" this generally resulted in about a 20 minute tow.

Target tow speed was 2.8 knots (5.2 km/h) over the ground throughout the survey.

The scope ratio used (ratio of trawl warp length to depth) was at the discretion of the fishing master.

Tows were classified as usable if they met three criteria;

- minimum of 15 minutes of good bottom contact;
- during daylight hours;
- at least half the tow had to be inside the selected survey block.

In general, if the net hung up during a tow it would be classified as unusable, however, if the net was retrieved quickly, without significant damage and had a minimum 15 minutes of bottom contact, the tow could be considered usable as long as the chief scientist and fishing master agreed.

CREW AND ITINERARY

Science compliment and itinerary are presented Table 5 and Table 6 respectively. The vessel departed Nanaimo on May 23rd ; science crew changes occurred on June 2nd and June 11th; and returned to Nanaimo June 19th. Science compliment was 8 for the first leg, 9 for the second, and 8 for the third. Included in the science compliment was an oceanographer for the first two legs and a consultant fisherman for the duration.

BRIDGE LOGGING

Throughout the survey the Chief Scientist and the mate on watch were jointly responsible for maintaining a record of all significant events occurring aboard the vessel. This not only included collecting data relevant to the survey but also keeping a record of any injuries, equipment problems, gear failures or damage, personnel issues, an itinerary of ports of call, and staffing changes. For every bottom trawl tow the chief scientist completed a groundfish "Bridge log" data form recording the tow and block numbers as well as detailed time, location, depth, environmental data and whether or not the tow was usable.

In addition to the paper record, a continuous electronic record of the ships position, navigational data, sea surface temperature and salinity and SIMRAD ITI net mensuratiom data were logged by a laptop connected to the ships network using NOAAs SCS (Scientific computing system) software. A second electronic record of each trawl track was recorded by the fishing master on the ships computer using Nobeltec™ version 6.0 navigation software. In addition to these records an "Electronic Bridge log form" was completed during each tow, the Electronic bridge log was designed as a front end to our field data base, **GFBioField**. **GFBioField** is used to enter data manually, off paper data forms, following each survey; once data are proofed they are uploaded from **GFBioField** to Pacific Region's corporate Groundfish biological database, **GFBio**. The form was designed to capture NMEA083 standard electronic data from the GPS and depth sounder to populate fields in the data base.

CATCH PROCESSING

At the end of each tow, the net was retrieved and the catch dumped into a hopper in the fish processing lab. Catch was sorted by species into separate baskets as it moved along a conveyor system. Catches in excess of 2000 kg were sub-sampled for species composition by selecting 5 baskets from the beginning, middle and end of the catch and weighing the rest of the unsorted catch in baskets. Baskets in the sub-sample were then dumped onto the conveyor and sorted to species; species proportions in the sub-sample were then applied to the unsorted catch weight. Several large conspicuous species (lingcod, halibut, skate, or pacific cod) were removed completely from these larger catches. This made it crucial to record the catch sorting method for each species to ensure they were not included in the calculation of species proportions for the unsorted catch.

Baskets were weighed to the nearest 0.1 kg using a large capacity, motion-compensating electronic balance (Marel Model M1100/M2000, 60 kg capacity). Weights were recorded on standard groundfish catch composition forms. Disposition of each basket of catch was also recorded on the catch composition form to provide cross validation of sampled species. Small catches were on occasion weighed using a smaller top - loading motion compensating balance (Marel Model 2200, 6 kg capacity). For small catches the number of individuals was often recorded as well as the weight.

Catch was sorted to lowest taxon possible. For most fishes this was to the level of species; invertebrates, however, were often only keyed to phylum or order.

Catch from unusable tows was neither sorted nor biologically sampled.

BIOLOGICAL SAMPLING

Length by sex frequency samples were collected from all species in every catch as long as they met the minimum samples size requirement and sampling frequency requirement outlined in Table 7; frequently encountered species were only sampled every second, third or fourth tow to free up additional sampler time for other less common species. Complete biological samples including length, sex, weight, maturity and an ageing structure were collected from the dominant species in the catch, a length, sex, weight sample was collected from the next most dominant species. When nearing the target of 300 ageing structures for a particular species sampling effort was transferred to less common species. Several species were preferentially sampled including several species of rockfish, skates, Pacific cod, and lingcod, see Table 8 for details.

Length and length/sex samples were collected using tally strips recorded to the nearest centimetre. Counts at length (and sex) were then transcribed to groundfish length frequency data forms; sample weights (by sex) were also recorded.

During complete biological sampling, length was determined to the nearest millimetre, weight to the nearest gram, and maturity to the nearest stage as defined in Appendix 1. Data for each specimen was recorded on standard "Card 04 – Biological Sampling" forms. Otoliths were collected for ageing rockfish and flatfish, second dorsal fin rays for lingcod and Pacific cod and right pectoral fins for pollock. Otoliths were cleaned and stored in "Tray Bien" otolith trays in a 50:50 solution of glycerine/water with 1 g thymol added per litre. For lingcod, rays 4 -10 of the second dorsal fin were collected, for Pacific cod the first 10 rays of the second dorsal fin, and for walleye pollock the entire right pectoral fin. Fins were collected in labelled coin envelopes with

the meaty part of the fin projecting. Envelopes from the same sample were bundled together and stored frozen until dried for processing.

OCEANOGRAPHIC DATA

Throughout the survey, CTD (Conductivity, Temperature and Depth) casts were performed at established "La Perouse Project" stations during the night. Once fishing operations ceased the vessel would immediately proceed to the nearest CTD transect line and commence CTD casts. In general one transect was completed per night. Casts were performed using a SeaBird SBE 911 guild-line CTD.

A captive thermosalinograph (SeaBird SBE 21) installed in the hull of the WE RICKER recorded continuous position, sea surface temperature and salinity data throughout the survey.

BIOMASS INDEX

The biomass index of fish species captured in the survey was obtained by multiplying the mean catch density per stratum by the area in each stratum and summing over all strata:

$$B = \sum_{i=1}^{k} C_i A_i = \sum_{i=1}^{k} B_i$$

where C_i = mean catch density (kg/km^2) for species s in stratum i.

A_i = area of stratum i (km^2).

B_i = biomass of species s in stratum i.

k = number of strata.

The mean catch density (C_i) in each stratum was calculated by:

$$C_i = \frac{\sum_{j=1}^{n_i} \left(W_j / D_j w_j \right)}{n_i}$$

where W_j = catch weight (kg) of tow j in stratum i.

D_j = length (km) of tow j in stratum i.

w_j = mean net width (doorspread; km) of tow j in stratum i.

n_i = number of tows in stratum i.

One thousand bootstrap replicates with replacement were performed on the survey data to estimate bias corrected 95% confidence limits and relative error for each biomass estimate, with relative error defined as the coefficient of variation (CV) of the distribution of the 1000 boot strapped estimates.

RESULTS

FISHING OPERATIONS

From a total of 28 vessel days, 2 days were required to load and offload the vessel at the start and end of the survey, one day was required to travel to and from the grounds, a half day each way, and an additional day and a half was lost to science crew changes (Table 5). No days were lost due to weather or equipment failures (Table 6). This resulted in 23.5 days of actual fishing time during which a total of 176 trawl sets were completed. Of these, 165 were successful while 11 failed due to fouled gear or a lack of bottom time. This resulted in an average of 7.0 successful tows per fishing day.

In total all 252 survey blocks were either fished or inspected. Table 4 summarizes the results by selection and final status. Thirty nine blocks were rejected on the basis of prior knowledge, 37 were rejected after an on grounds inspection, and 11 were rejected after failed fishing attempts. One hundred and 165 blocks were fished successfully on the first attempt, no blocks were fished successfully after an initial failure. This resulted in a final status of 165 successfully fished survey blocks and 87 rejected blocks. Figure 4 shows the final status of survey blocks. Figure 5 to Figure 8 show plots of individual trawl tracks; red blocks with no trawl track were rejected on the basis of prior knowledge or an inspection; green blocks were fished successfully on the first attempt. Again, as in 2004, there are several tows that were classified as successful (Usable) even though half the trawl track was not within the block. By the rules outlined above these blocks should have been rejected. However, one must be somewhat pragmatic given the limited vessel and personnel resources available, so following each tow the chief scientist and fishing master determined the reason(s) for the tow occurring outside the block, and if it could be clearly determined that either current, weather, or a misjudgment in timing was the cause, that tow was retained as usable.

Appendix 2 lists details for each trawl tow including time, position, depth, duration, speed, direction of the set, block number, total catch weight and whether or not the tow was usable.

CATCH

A total of 117,638 kg of mixed fish and invertebrates were caught during the survey. By species group the catch was dominated by rockfish which accounted for 35 % of the total catch weight, flatfish and cartilaginous fishes each accounted for 28 % of the catch while round fish only accounted for 8 % of the catch (Table 9). Seventy five percent of the catch by weight was comprised of the following nine species: spiny dogfish, arrowtooth flounder, canary rockfish, Pacific ocean perch, yellowtail rockfish, sablefish, splitnose rockfish, Dover sole, and sharpchin rockfish (Table 10). The most common species were rex sole and spiny dogfish occurring in 91 % and 85 % of tows. Fragile urchin was both the most abundant and most common invertebrate encountered. Species catches by tow are presented in Appendix 3.

Mean catch weight per usable tows was 710 kg, while median catch weight was 399 kg. Five percent of tows caught less than 50 kg, 5 % of tows were larger than 1,000 kg, and 90 % of tows weighed between 50 and 1,000 kg (Figure 9).

On average 19 species were recorded per tow with a maximum of 35. Of 168 unique identifications made in the field 130 of these are to the level of genus and species (Appendix 4). One hundred fish species were identified (Table 9) including 30 rockfish, 13 flatfish, and 6 elasmobranches. Sixty five invertebrate species groups were identified. Invertebrates were recoded from 145 of 165 sets, averaging 3 species per tow with a maximum of 8.

Maps of catch for the dominant species encountered are presented in Figure 10 to Figure 19. The circles are scaled to the total catch weight, and all species are presented on the same scale.

BIOMASS INDICES

Biomass indices have been generated for the species with total catch weights greater than 25 kg and are presented in Table 10. When interpreting these indices it is important to remember that they are relative and are being presented here to facilitate comparisons between survey areas and survey years. These indices should not be interpreted as estimates of population biomass because the numbers can be changed dramatically by changing either the estimate of habitat area or the method used to determine the area swept by the trawl.

Area swept is determined by multiplying the effective path width of the net by the distance towed. Effective path width is in fact, a pragmatic choice, it is the distance between the trawl doors, the distance between the wingtips of the net or possibly something in between like the distance between the leading ends of the lower bridle. If you believe the species for which you are computing a biomass index is effectively herded by the sweep wires or bridles your preference would be to use door or bridle spread, if on the other hand you believe no herding takes place then you'd simply use the wingtip spread. The standardized approach to all species taken here is to use trawl door spread as the effective path width. Distance towed was determined in one of two ways. For tows with available bottom contact data we used the start and end bottom contact times to determine start and end positions in the GPS track line data and integrated the distances between all observed positions during the tow. For tows without bottom contact data we used the mean vessel speed during the tow and tow duration to calculate distance towed.

As stated earlier in the report, habitat area was computed using a GIS and included all the area of each depth stratum within the survey area excluding only enclosed waters and rockfish conservation areas. It is likely that this grossly overestimates the true habitat for a given species due to each species preference for a particular substrate and topography, after all a sole is unlikely to live on a rocky reef and a rockfish is unlikely to be found on a flat sandy bottom. Future indices might be computed using more complex species specific estimates of habitat derived from habitat models that incorporate factors such as substrate type, relative slope, hardness, currents or water properties (oxygen, pH). Until these become available the generalized estimates derived here will be used.

Species with the highest biomass indices were: spiny dogfish, arrowtooth flounder, canary rockfish, Pacific ocean perch, yellowtail rockfish, and sablefish. Species with the most precise indices, or lowest relative error, included Dover sole, rex sole,

longnose skate, lingcod, English sole and petrale sole. With 165 usable tows, 14 species were below the target relative error of 0.2, 10 species were between 0.2 and 0.3, and another 11 species fell between 0.3 and 0.5. One of the design objectives of this series of surveys is for each area specific survey to generate 20 or more biomass indices with relative errors of less than 0.2, this survey nearly achieved that goal with 20 species having REs of less than 0.25.

BIOLOGICAL DATA

A total of 1,230 samples comprising 31,599 specimens across 60 species were sampled and 7,112 ageing structures were collected from 32 species. Table 11 catalogues the attributes collected by species, Table 12 lists the sample types by species and Table 13 summarizes length, weight and sex proportions by species.

GEAR PERFORMANCE DATA

Table 14 lists vessel, environmental and gear performance data collected during the survey. Global positioning system (GPS) latitude and longitude were recorded during 162 of 165 usable tows. Seabird SBE 39 temperature and depth data were recorded for 165 sets while bottom contact data is available for 163 sets. An example SBE 39 temperature depth profile is presented in Figure 20. Two example bottom contact traces from the NMFS BCS are presented; Figure 21 shows a trace while fishing on smooth mud or sand bottom while Figure 22 shows a trace on rougher bottom.

Mean vessel speed while fishing (during usable sets) ranged from 4.3 km/h to 7.0 km/h, with a mean of 5.49 km/h.

SIMRAD ITI data on net height and door spread and net depth were recorded both electronically and manually throughout the survey. Electronically logged door spread data are available for 137 sets, net height data is available for 135 sets. Mean door spread was 62.7 m (41.4 – 71.8 m) mean net height was 3.7 m (2.2 – 6.6) and wingtip spread for which there was only 2 measurements made was 13.2 m. Due to concerns over the downward herding effect of the third wire used in 2004 it was not employed during this survey.

The relationship between warp length and bottom depth is plotted in Figure 23. The scope ratio ranged from 1.8 to 4.0 with a mean of 2.7. In general the scope ratio selected by the fishing master decreased as depth increased (Figure 24) although on many occasions when the bottom topography was rough a lower scope ratio was used to reduce the likelihood of hanging up. As depth increased variability in scope ratio decreased, note in Figure 25 the wide range of scope ratios employed in relatively shallow depths.

Appendix 5 lists mean sensor data by set.

OCEANOGRAPHIC DATA

CTD casts were performed at 91 established "La Perouse Project" stations (Figure 26). Dissolved oxygen, salinity, temperature and depth were recorded during 152 of 165 sets using a net mounted SeaBird SBE 16+ CTD. This was the first instance of this application for this device in the Pacific region. An example plot is presented in Figure 27, note the differences in water properties between the deployment (downcast) and

retrieval (upcast) of the net and the variability in water properties while towing. It is postulated that over time these data will help explain some of the inter-annual variation in species abundance indices and distributions. Both SEB 911 and SBE 16 + data have been processed by staff at the Institute of Ocean Sciences, Sidney BC, and added to the oceanographic data archive (Mr Robin Brown, Custodian). Captive thermosalinograph (sea surface temperature and salinity) is available from 158 of 165 usable tows and data have been incorporated into the groundfish surveys database.

CONCLUSIONS - RECOMMENDATIONS

- During future WCVI surveys the number of usable tows must be maintained at ~ 170 to come close to generating adequately precise abundance indices for most of the major commercial species;
- As recommended in 2004 the depth range for this survey should be increased to at least 1200 m for 2008, however this must be done without loss of sampling effort in the 50 – 500 m depth range;
- Progress has been made in identifying un-trawlable bottom, as a consequence significantly less gear damage was sustained during the 2006 survey than during the 2004 survey additional efficiencies may be achieved by further reviewing the survey design with commercial fishers and the vessels fishing master;
- All future surveys should continue to collect in situ oceanographic data;
- Refinement of the biological sampling protocol has effectively transferred sampling effort to less common species while ensuring adequate sampling of the dominant species in the catch.
- Additional resources must be invested in automated data collection systems to improve efficiency and reduce recording errors.

ACKNOWLEDGEMENTS

The officers and crew of the WE RICKER are to be commended for their service during this survey. Fishing and oceanographic vessel handling was accurate and timely, fishing gear was handled in a professional manner and repairs were made quickly; the engineering staff ensured all vessels systems were operational and addressed defects in a timely manner, the galley staff ensured all science crew were comfortable and their personal needs addressed. The Canadian Groundfish Research and Conservation Society, in particular Mr Bruce Turris, was very helpful in providing the trawl nets for the survey and contracted Captain Gary Sigmund as the consultant fisherman for the survey. Mrs. Karina Cooke must be thanked for her thorough review of the transcript.

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TABLES

Table 1: Mean annual observed bottom trawl catch coastwide and for the west coast of Vancouver Island (retained + discarded) in metric tones, as well as the proportion of the coastwide catch which is taken off the WCVI. Listed are the 27 species which comprise 95 % of the catch off the WCVI.

Common Name	Coast wide	WCVI	Proportion of coast wide catch
Arrowtooth flounder	8611	3436	40%
Dover sole	3060	1351	44%
Yellowtail rockfish	1982	859	43%
Lingcod	1552	705	45%
Spiny dogfish	1294	651	50%
Longspine thornyhead	672	580	86%
Pacific ocean perch	5752	503	9%
Canary rockfish	714	425	60%
Pacific hake	514	398	77%
Sablefish	657	392	60%
Shortspine thornyhead	616	349	57%
Petrale sole	445	252	57%
Redstripe rockfish	883	231	26%
Silvergray rockfish	1139	229	20%
Yellowmouth rockfish	2047	216	11%
Pacific cod	972	203	21%
Rougheye rockfish	561	141	25%
Rex sole	589	131	22%
Sharpchin rockfish	370	128	35%
Longnose skate	314	123	39%
Grenadiers	152	96	63%
Pacific halibut	474	94	20%
Spotted ratfish	724	93	13%
English sole	958	80	8%
Tanner crabs	83	79	95%
Bocaccio	175	57	33%
Widow rockfish	242	52	21%

Table 2: Specifications for the Atlantic Western IIa trawl net used as the primary survey trawl throughout the 2006 west coast Vancouver Island groundfish bottom trawl survey.

Part		Material
Rigging		
Doors	1135 kg each	USA Jet Model P
Door Legs	30'	¾" chain
Pickups	45'	⅞" cable
Sweep Line	90'	⅞" cable
Upper bridle	90'	¾" cable
Lower bridle	90'	⅞" cable
Net frame		
Headline	74' 6"	11 mm long link chain and 1" poly steel rope
Headline floats	89	8" plastic Spheres (23, 13, 17, 13, 23)
Riblines	21' 6", 36' 6", 36' 6", 32' 4"	1¼ " Polysteel rope in four sections, Taper, Intermediate x2, and Codend.
Bolsch Line	68' 4"	1" poly steel rope
Fishing Line	68' 4"	11 mm long link chain
Wing lines	22' 3"	11 mm long link chain and 1 " poly steel rope
Foot Rope		
Foot Rope	107' 4"	½" Chain for bunt wing, mid wing and wing extensions, 3 lengths of ⅜" chain in bosom sections joined with ½" hammer locks.
Bosom section	14'	18" tires (24) spaced 6" on center with 3" rubber disks separating the tires, three lengths of ⅜" chain run the width of the section at 0, 120 and 240 degree angles when viewing the tire section on end, one ⅜" black shackle and one ½ " anchor shackle on ⅜ " chain lengths between every second tire to shackle onto fishing line.
Bunt Wing Section	18'	18" rock hopper, 18" disks (11) spaced 21" apart, 5" rubber disks between rock hopper disks, 5" Lancaster centered between rock hopper disks with a length of ⅜" chains hanging from the Lancaster
Mid Wing Section	8' 8"	18" rock hopper, same as bunt section
Wing Extension	19' 6"	5" packed rubber disks with 18" half egg at the front and a 18" half egg at the back of the section mounted on a three hole delta plate welded to a 1" steel shaft
Rock hopper line	8'8", 18', 18', 8' 8"	Gathered at quarters where joined to bosom, shackled to fishing line for bunt and mid wing sections.
Web		
Flying Wing	5"	4.5 mm double Euroline premium
Wing	5"	3.5 mm single Euroline premium
Square	5"	3.5 mm single Euroline premium
Bunt wing	5"	3.5 mm single Euroline premium
Bellies	4.5"	3.5 mm single Euroline premium
Intermediate	4.5"	4.5 mm single Euroline premium
Guard Mesh	4.5 or 5"	4.5 mm double Euroline premium
Codend	4.5"	4.5 mm double orange polyethylene
Liner	¼ "	Notless Nylon

Table 3: Survey strata depth ranges and estimated area of each for the WCVI.

Depth Stratum		Area
Meters	Fathoms	(km^2)
50 – 125	27 - 68	7,012
125 - 200	68 - 109	4,313
200 - 330	109 - 164	804
330 - 500	164 - 273	789
		12,918

Table 4: Number of survey blocks selected from each depth stratum prior to the survey (Total blocks), and success, failure or rejection at each of those locations.

	Rejected blocks			Tows			Total	Rejection
Stratum	Knowledge	Inspection	Total	Fail	Success	Total	Blocks	Rate
50-125	12	29	41	3	57	60	101	40.6%
125-200	17	3	20	5	68	73	93	21.5%
200-330	4	3	7	2	21	23	30	23.3%
330-500	6	2	8	1	19	20	28	28.6%
Total	39	37	76	11	165	176	252	28.5%

Table 5: Staffing and leg durations for each leg of the 2006 WCVI survey.

Role	Leg 1 May 23 – June 2	Leg 2 June 2 - 11	Leg 3 June 11 - 20
Captain	Stu Aldridge	Stu Aldridge	Stu Aldridge
Fishing Master	Brian West	Brian West	Brian West
Chief Scientist	Greg Workman	Greg Workman	Jeff Fargo
Lab Boss	Malcolm Wyeth	Alicia Hooper	Alicia Hooper
Lab Staff	Rob Kronlund	Rob Kronlund	Brian Krishka
Lab Staff	Norm Olsen	Ed Choromanski	Ed Choromaski
Lab Staff	Alicia Hooper	Schon Acheson	Kristine Anderson
Lab Staff	Matt Drake	Anna Gerrard	Anna Gerrard
Lab Staff		Matt Drake	Matt Drake
Oceanographer	Lesley MacDougall	Lesley MacDougall	NA
Industry Representative	Gary Sigmund	Gary Sigmund	Gary Sigmund

Table 6: Summary of survey operations and itinerary.

Start: Depart PBS	May 23
End: Offload PBS	June 19
Fishing days	23.5
Travel (begin and end)	1
Crew change days	1.5
Weather days	0
Breakdown	0
Load/offload vessel	2
Total days	28
Keeper tows	165
Unusable tows	11
Inspected un-fished blocks	76
Tows per day overall	7.5
Usable tows per fishing day	7.0
Mean catch per keeper tow	710
Mean species per keeper tow	19

Table 7: Length sex frequency sampling protocol.

Species	Sample Frequency	Minimum number to sample
Arrowtooth flounder	Every third Set	10
Black hagfish	All	1
Brown cat shark	All	1
Canary rockfish	Every Second Set	10
Curlfin sole	All	10
Dover sole	Every Third Set	10
English sole	Every Second Set	10
Flathead sole	Every Second Set	10
Greenstriped rockfish	Every Second Set	10
Kelp greenling	All	5
Longspine thornyhead	All	10
Pacific hake	Every Third set	10
Pacific halibut	All	10
Pacific ocean perch	Every Second Set	10
Pacific sanddab	Every Second Set	10
Pacific tomcod	All	25
Puget sound rockfish	All	10
Pygmy rockfish	All	10
Redstripe rockfish	All	10
Rex sole	Every Third Set	10
Rosethorn rockfish	Every Second Set	10
Rougheye rockfish	All	10
Sablefish	All	1
Sand sole	All	25
Sharpchin rockfish	Every Second Set	10
Shortspine thornyhead	All	10
Silvergray rockfish	All	10
Slender sole	Every Third Set	10
Spiny dogfish	Every Third Set	10
Splitnose rockfish	All	10
Spotted ratfish	Every Fourth Set	10
Starry flounder	All	1
Stripetail rockfish	All	1
Tiger rockfish	All	1
Vermilion rockfish	All	1
Walleye pollock	Every Second Set	10
Widow rockfish	All	1
Wolf eel	All	1
Yellowmouth rockfish	All	1
Yellowtail rockfish	Every Second Set	10

Table 8: Biosample protocol for selected species.

Species	Rule
Pacific Cod	Length stratified L/S/W/second dorsal fin, one fish per cm by sex. Remaining Pacific cod, up to 100 total sample size, sampled for L/S/W.
Lingcod	If more than 10 Collect up to 50 fins, if less then L/S/W
Bocaccio	Total catch L/S/M/W/O, max. 100 per set.
Copper rockfish	Total catch L/S/M/W/O, max. 100 per set.
Darkblotched rockfish	Total catch L/S/M/W/O, max. 100 per set.
Quillback rockfish	Total catch L/S/M/W/O, max. 100 per set.
Redbanded rockfish	If catch > 5 pieces, Total catch L/S/M/W/O, max. 100 per set.
Shortraker Rockfish	Total catch L/S/M/W/O, max. 100 per set.
Yelloweye rockfish	Total catch L/S/M/W/O, max. 100 per set.
Petrale sole	Total catch L/S/M/W/O, max. 100 per set.
Rock sole	Total catch L/S/M/W/O, max. 100 per set.
All Skates	Total catch L/S
All others species of rockfish and flatfish	40 – 60 L/S/M/O/W per set if one of the dominant species in the catch with the overall objective of collecting ~ 300 otoliths per species over the course of the survey.

Table 9: Catch by species group

Species Category	Number of Taxa	Weight (Kg)
All Fish	100	117,840
Rockfish	30	41,674
Flatfish	13	32,935
Roundfish	8	9,914
Cartilaginous fish	6	33,084
Other fish	43	234
Invertebrates	65	487

Table 10: Catch by species for all (42) species with total catch weights in excess of 25 kg from usable tows. Listed are the frequency of occurrence, total catch weight, maximum and mean per-tow catch weight, and the relative biomass index in metric tones with its relative error.

Species	Number of Tows	Catch Weight (kg) Total	Maximum	Mean	Relative Abundance	CV
Spiny dogfish	139	29,465.6	11,053.0	212.0	26502	0.49
Arrowtooth flounder	129	19,222.2	1,796.9	149.0	9155	0.17
Canary rockfish	48	8,911.1	4,168.2	185.6	4878	0.51
Pacific ocean perch	60	8,537.6	879.0	142.3	3086	0.17
Yellowtail rockfish	46	6,041.1	4,578.6	131.3	4218	0.74
Sablefish	81	4,826.2	412.2	59.6	1940	0.15
Splitnose rockfish	34	4,574.3	908.3	134.5	1877	0.29
Dover sole	133	4,549.7	235.4	34.2	2047	0.10
Sharpchin rockfish	44	3,424.8	1,203.0	77.8	1258	0.37
Rex sole	148	3,324.0	299.8	22.5	2115	0.12
Lingcod	118	2,944.2	241.9	25.0	2166	0.14
Redstripe rockfish	32	2,394.8	1,344.4	74.8	1335	0.54
Spotted ratfish	132	2,263.9	209.2	17.2	1556	0.16
Pacific halibut	92	1,942.1	221.4	21.1	1617	0.19
Pacific cod	89	1,876.5	266.3	21.1	1289	0.25
English sole	107	1,482.9	102.6	13.9	1358	0.15
Silvergray rockfish	42	1,443.4	149.3	34.4	777	0.25
Rougheye rockfish	31	1,281.3	346.4	41.3	446	0.35
Greenstriped rockfish	69	1,190.5	174.3	17.3	624	0.22
Longnose skate	81	1,076.8	68.0	13.3	580	0.13
Pacific sanddab	59	1,063.2	167.3	18.0	1138	0.21
Shortspine thornyhead	41	774.3	99.7	18.9	320	0.19
Bocaccio	28	648.0	448.8	23.1	354	0.66
Darkblotched rockfish	35	511.1	134.6	14.6	190	0.28
Yellowmouth rockfish	9	475.0	108.0	52.8	211	0.41
Petrale sole	96	426.0	34.6	4.4	320	0.14
Redbanded rockfish	48	351.2	50.4	7.3	143	0.19
Flathead sole	45	271.2	50.2	6.0	223	0.31
Big skate	12	243.1	57.3	20.3	209	0.39
Shortraker rockfish	13	213.6	95.1	16.4	82	0.44
Pacific hake	39	195.1	27.6	5.0	76	0.19
Yelloweye rockfish	17	153.2	23.1	9.0	89	0.28
Slender sole	84	143.1	36.0	1.7	107	0.38
Rosethorn rockfish	37	132.2	29.6	3.6	53	0.25
Southern rock sole	26	74.7	12.5	2.9	88	0.27
Green sturgeon	1	63.5	63.5	63.5	76	0.97
Widow rockfish	11	54.9	35.8	5.0	29	0.67
Eulachon	25	50.2	11.4	2.0	30	0.34
Quillback rockfish	8	44.7	19.1	5.6	54	0.52
Walleye pollock	14	32.9	9.3	2.4	34	0.50
Pacific herring	38	32.6	8.4	0.9	27	0.37
Sandpaper skate	18	26.5	5.4	1.5	14	0.24

Table 11: Number of samples and recorded biological attributes per species sampled.

Species	Samples	Lengths	Weights	Sexes	Maturities	Ages
American shad	1	10	0	10	0	0
Arrowtooth flounder	36	1,999	475	1,999	475	302
Aurora rockfish	2	5	2	5	0	0
Big skate	12	20	6	20	0	0
Bigeye poacher	1	25	0	0	0	0
Bocaccio	28	155	155	155	155	155
Brown cat shark	2	19	0	19	0	0
Canary rockfish	15	602	373	602	373	198
China rockfish	1	11	11	11	11	11
Chinook salmon	2	2	2	2	0	0
Chum salmon	1	2	2	2	0	0
Copper rockfish	1	5	5	5	5	5
Curlfin sole	8	13	3	13	0	0
Darkblotched rockfish	28	552	482	552	481	427
Dover sole	44	1,824	490	1,824	490	336
English sole	35	1,837	694	1,836	693	388
Eulachon	2	193	0	0	0	0
Flathead sole	13	533	266	532	266	84
Green sturgeon	1	1	0	0	0	0
Greenstriped rockfish	23	1,128	147	1,128	147	122
Grenadiers	1	10	0	10	0	0
Harlequin rockfish	1	4	0	4	0	0
Kelp greenling	3	3	3	3	0	0
Lingcod	117	713	620	712	610	321
Longnose skate	80	225	46	225	0	0
Longspine thornyhead	2	86	0	61	0	0
Pacific cod	88	1,413	1,411	1,413	1,410	653
Pacific hake	6	197	0	197	0	0
Pacific halibut	89	328	228	327	92	0
Pacific herring	4	138	0	0	0	0
Pacific ocean perch	28	1,579	542	1,579	542	479
Pacific sand lance	1	15	0	0	0	0
Pacific sanddab	22	1,511	270	1,511	269	179
Petrale sole	94	553	474	552	466	279
Pile perch	1	25	0	25	0	0
Pygmy rockfish	1	14	0	14	0	0
Quillback rockfish	8	42	42	42	42	42
Redbanded rockfish	41	370	361	369	360	315
Redstripe rockfish	10	583	218	582	217	175
Rex sole	50	3,199	488	3,199	487	238
Rosethorn rockfish	8	291	117	291	117	117
Rougheye rockfish	13	475	418	475	417	295
Sablefish	61	1,317	628	1,317	606	409
Sandpaper skate	18	24	13	24	0	0
Sharpchin rockfish	16	1,060	150	1,060	150	103
Shortbelly rockfish	2	115	0	115	0	0
Shortraker rockfish	14	28	28	28	28	23

Table 11: Continued.

Species	Samples	Lengths	Weights	Sexes	Maturities	Ages
Shortspine thornyhead	20	1,477	287	1,471	124	141
Silvergray rockfish	19	537	245	537	243	177
Slender sole	16	471	1	471	1	0
Southern rock sole	21	221	221	221	221	217
Spiny dogfish	40	2,462	79	2,462	0	0
Splitnose rockfish	20	1,242	428	1,242	428	351
Spotted ratfish	17	1,014	0	1,014	0	0
Stripetail rockfish	1	33	0	33	0	0
Walleye pollock	2	90	0	90	0	0
Widow rockfish	7	39	29	39	27	27
Yelloweye rockfish	16	50	50	50	50	50
Yellowmouth rockfish	9	303	303	303	303	300
Yellowtail rockfish	7	406	193	406	193	193
Total	1,230	31,599	11,006	31,189	10,499	7,112

Table 12: Number of samples and specimen by sample type for sampled species.

Species	Total		Len/Sex		Len/Sex/Wt		Len/Sex/Wt/Age	
	N	n	N	n	N	n	N	n
American shad	1	10	1	10	0	0	0	0
Arrowtooth flounder	36	1,999	27	1,524	3	173	6	302
Aurora rockfish	2	5	1	3	1	2	0	0
Big skate	12	20	6	14	6	6	0	0
Bigeye poacher	1	25	1	25	0	0	0	0
Bocaccio	28	155	0	0	0	0	28	155
Brown cat shark	2	19	2	19	0	0	0	0
Canary rockfish	15	602	8	229	3	175	4	198
China rockfish	1	11	0	0	0	0	1	11
Chinook salmon	2	2	0	0	2	2	0	0
Chum salmon	1	2	0	0	1	2	0	0
Copper rockfish	1	5	0	0	0	0	1	5
Curlfin sole	8	13	5	10	3	3	0	0
Darkblotched rockfish	28	552	2	70	3	55	23	427
Dover sole	44	1,824	34	1,334	3	152	7	336
English sole	35	1,837	22	1,143	6	306	7	388
Eulachon	2	193	2	193	0	0	0	0
Flathead sole	13	533	8	267	3	182	2	84
Green sturgeon	1	1	1	1	0	0	0	0
Greenstriped rockfish	23	1,128	19	981	1	25	3	122
Grenadiers	1	10	1	10	0	0	0	0
Harlequin rockfish	1	4	1	4	0	0	0	0
Kelp greenling	3	3	0	0	3	3	0	0
Lingcod	117	713	19	93	78	298	20	321
Longnose skate	80	225	43	179	37	46	0	0
Longspine thornyhead	2	86	2	86	0	0	0	0
Pacific cod	88	1,413	1	2	58	310	29	653
Pacific hake	6	197	6	197	0	0	0	0
Pacific halibut	89	328	13	100	76	228	0	0
Pacific herring	4	138	4	138	0	0	0	0
Pacific ocean perch	28	1,579	18	1,037	1	63	9	479
Pacific sand lance	1	15	1	15	0	0	0	0
Pacific sanddab	22	1,511	17	1,241	1	91	4	179
Petrale sole	94	553	15	79	63	194	16	279
Pile perch	1	25	1	25	0	0	0	0
Pygmy rockfish	1	14	1	14	0	0	0	0
Quillback rockfish	8	42	0	0	0	0	8	42
Redbanded rockfish	41	370	1	9	5	46	34	314
Redstripe rockfish	10	583	6	365	1	43	3	175
Rex sole	50	3,199	41	2,711	4	250	5	238
Rosethorn rockfish	8	291	5	174	0	0	3	117
Rougheye rockfish	13	475	4	57	4	123	5	295
Sablefish	61	1,317	32	689	20	219	9	409
Sandpaper skate	18	24	6	11	12	13	0	0
Sharpchin rockfish	16	1,060	13	910	1	47	2	103
Shortbelly rockfish	2	115	2	115	0	0	0	0
Shortraker rockfish	14	28	0	0	5	5	9	23

Table 12: Continued.

Species	Total N	Total n	Len/Sex N	Len/Sex n	Len/Sex/Wt N	Len/Sex/Wt n	Len/Sex/Wt/Age N	Len/Sex/Wt/Age n
Shortspine thornyhead	20	1,477	16	1,190	2	146	2	141
Silvergray rockfish	19	537	11	292	3	69	5	177
Slender sole	16	471	15	470	1	1	0	0
Southern rock sole	21	221	0	0	2	4	19	217
Spiny dogfish	40	2,462	39	2,383	1	79	0	0
Splitnose rockfish	20	1,242	13	814	1	77	6	351
Spotted ratfish	17	1,014	17	1,014	0	0	0	0
Stripetail rockfish	1	33	1	33	0	0	0	0
Walleye pollock	2	90	2	90	0	0	0	0
Widow rockfish	7	39	3	10	2	2	2	27
Yelloweye rockfish	16	50	0	0	0	0	16	50
Yellowmouth rockfish	9	303	0	0	2	3	7	300
Yellowtail rockfish	7	406	4	213	0	0	3	193
Total	1,230	31,599	513	20,593	418	3,443	298	7,111

Table 13: Biological characteristics of sampled species.

Species	Length (cm)			Weight (kg)			Sex Proportion	
	Min.	Max.	Mean	Min.	Max.	Mean	Male	Female
American shad	24.0	37.0	31.6				0.40	0.60
Arrowtooth flounder	18.5	81.5	50.6	0.05	5.47	1.35	0.28	0.72
Aurora rockfish	24.0	36.0	28.2	0.31	0.31	0.31	0.60	0.40
Big skate	58.0	177.0	106.1	1.25	33.71	10.05	0.40	0.60
Bigeye poacher	17.0	22.0	19.7				0.00	0.00
Bocaccio	31.5	85.9	66.2	0.32	8.93	3.96	0.60	0.40
Brown cat shark	34.0	52.0	43.2				0.84	0.16
Canary rockfish	11.0	69.0	43.5	0.02	3.53	1.69	0.53	0.47
China rockfish	25.7	34.0	30.7	0.31	0.76	0.56	0.55	0.45
Chinook salmon	59.0	63.6	61.3	2.65	3.22	2.94	0.50	0.50
Chum salmon	66.8	69.9	68.3	3.95	5.08	4.52	0.00	1.00
Copper rockfish	30.8	39.0	35.6	0.50	1.09	0.82	0.80	0.20
Curlfin sole	20.0	34.0	27.6	0.01	0.17	0.09	0.62	0.38
Darkblotched rockfish	11.9	73.6	33.4	0.02	2.05	0.79	0.50	0.50
Dover sole	21.3	61.0	35.9	0.09	1.80	0.45	0.55	0.45
English sole	12.5	60.2	32.3	0.04	0.75	0.35	0.21	0.79
Eulachon	8.0	20.0	14.3				0.00	0.00
Flathead sole	11.0	43.0	30.4	0.01	0.47	0.26	0.43	0.56
Green sturgeon	202.0	202.0	202.0				0.00	0.00
Greenstriped rockfish	10.0	39.7	26.3	0.10	0.82	0.43	0.49	0.51
Grenadiers	60.0	79.0	72.9				0.20	0.80
Harlequin rockfish	16.0	17.0	16.5				0.00	1.00
Kelp greenling	25.0	36.0	28.6	0.01	0.75	0.33	0.00	1.00
Lingcod	31.0	109.0	71.9	0.34	12.67	3.90	0.24	0.76
Longnose skate	32.0	145.0	85.6	0.37	20.58	5.44	0.44	0.56
Longspine thornyhead	6.0	26.0	17.6				0.38	0.28
Pacific cod	22.7	79.3	46.9	0.11	5.58	1.26	0.47	0.53
Pacific hake	16.0	77.0	34.0				0.39	0.61
Pacific halibut	22.5	125.0	76.3	1.78	19.99	5.48	0.68	0.32
Pacific herring	16.0	24.0	18.9				0.00	0.00
Pacific ocean perch	14.0	75.0	36.0	0.04	1.60	0.85	0.46	0.54
Pacific sand lance	14.0	19.0	16.1				0.00	0.00
Pacific sanddab	7.1	34.0	24.3	0.00	0.36	0.12	0.44	0.56
Petrale sole	21.2	59.1	39.0	0.08	7.79	0.79	0.45	0.55
Pile perch	14.0	18.0	16.1				0.00	0.00
Pygmy rockfish	18.0	24.0	20.6				0.07	0.93
Quillback rockfish	26.9	45.5	37.4	0.39	1.98	1.06	0.50	0.50
Redbanded rockfish	8.3	59.5	35.0	0.01	3.88	0.91	0.52	0.48
Redstripe rockfish	15.0	39.4	25.3	0.07	0.96	0.29	0.53	0.46
Rex sole	8.0	47.0	30.9	0.03	0.79	0.19	0.57	0.43
Rosethorn rockfish	11.7	40.6	23.7	0.02	0.43	0.22	0.52	0.48
Rougheye rockfish	20.4	77.0	45.6	0.12	3.92	1.49	0.57	0.43
Sablefish	21.1	96.0	58.8	0.39	10.55	2.24	0.67	0.33
Sandpaper skate	30.0	64.0	54.7	0.66	1.69	1.06	0.42	0.58
Sharpchin rockfish	12.0	37.7	24.0	0.11	0.96	0.43	0.51	0.49
Shortbelly rockfish	17.0	27.0	21.8				0.44	0.56

Table 13: Continued

Species	Length (cm)			Weight (kg)			Sex Proportion	
	Min.	Max.	Mean	Min.	Max.	Mean	Male	Female
Shortraker rockfish	46.0	84.0	64.8	1.45	9.83	4.68	0.54	0.46
Shortspine thornyhead	6.0	63.0	23.1	0.00	3.31	0.25	0.50	0.50
Silvergray rockfish	25.0	63.0	52.1	0.45	3.96	2.00	0.75	0.25
Slender sole	8.0	33.3	23.3	0.43	0.43	0.43	0.44	0.56
Southern rock sole	13.9	48.9	28.4	0.03	1.59	0.32	0.34	0.66
Spiny dogfish	39.0	120.0	68.0	0.48	2.81	1.25	0.53	0.47
Splitnose rockfish	8.0	43.2	24.1	0.03	1.06	0.37	0.49	0.51
Spotted ratfish	9.0	56.0	31.5				0.48	0.52
Stripetail rockfish	18.0	30.0	23.5				0.36	0.64
Walleye pollock	20.0	37.0	24.9				0.46	0.54
Widow rockfish	21.0	55.0	40.4	0.61	2.23	1.41	0.33	0.67
Yelloweye rockfish	40.8	67.2	51.6	1.20	5.97	2.87	0.46	0.54
Yellowmouth rockfish	14.5	83.6	42.2	0.23	2.50	1.30	0.60	0.40
Yellowtail rockfish	15.5	54.0	39.2	0.17	2.29	1.08	0.53	0.47

Table 14: Summary of data logged from ship board and net mounted systems.

Sensor	Attribute	Num. Tows	Num. Records
Global positioning system (GPS)	Vessel direction - compass bearing true north	173	38,347
Global positioning system (GPS)	Vessel position - latitude	173	38,360
Global positioning system (GPS)	Vessel position - longitude	173	38,360
NMFS bottom contact sensor	Bottom contact sensor tilt angle	174	53,710
Seabird SBE 19plus seacat profiler	Dissolved oxygen	163	308,436
Seabird SBE 19plus seacat profiler	Net depth	163	308,436
Seabird SBE 19plus seacat profiler	Salinity at net depth	163	308,436
Seabird SBE 19plus seacat profiler	Water temperature at net depth	163	308,436
Seabird SBE 39 temperature and pressure sensor	Net depth	169	93,413
Seabird SBE 39 temperature and pressure sensor	Water temperature at net depth	169	93,413
Seabird seacat 21 temperature and salinity sensor	Ocean salinity at surface	169	12,453
Seabird seacat 21 temperature and salinity sensor	Water temperature at surface	169	12,453
Simrad ITI trawl system	Net depth	146	6,310
Simrad ITI trawl system	Trawl net change in depth	146	6,310
Simrad ITI trawl system	Trawl net doorspread	160	6,567
Simrad ITI trawl system	Trawl net footrope to headline distance (opening)	158	5,439
Simrad ITI trawl system	Trawl net headrope to bottom distance	158	5,439
Simrad ITI trawl system	Water temperature at net depth	160	7,141

Table 15: Depth fished, length of main warp deployed and scope ratio for all usable sets.

Set	Depth (m)	Warp	Scope	Set	Depth (m)	Warp	Scope	Set	Depth (m)	Warp	Scope	Set	Depth (m)	Warp	Scope
1	76.5	200	2.61	45	51.9	175	3.37	89	142.1	400	2.81	133	189.9		
2	72.1	200	2.77	46	55.2	200	3.62	90	147.3	450	3.05	134	141.6		
3	88.0			47	210.2	450	2.14	91	132.1	375	2.84	135	150.8	450	2.98
4	104.8			48	497.6			92	93.9	300	3.20	136	142.2	400	2.81
5	474.5	850	1.79	49	201.7	500	2.48	93	84.3	275	3.26	137	160.2	400	2.50
6	191.0	450	2.36	50	102.6	300	2.92	94	117.6	350	2.98	138	261.8	900	3.44
7	137.7	350	2.54	51	121.7	300	2.46	95	104.2	300	2.88	139	52.2	150	2.88
8	132.0	250	1.89	52	102.7	300	2.92	96	84.2	250	2.97	140	110.2		
9	142.9			53	89.0	250	2.81	97	135.6	400	2.95	141	108.9	300	2.75
10	124.1	300	2.42	54	115.4	350	3.03	98	189.7	600	3.16	142	185.9	450	2.42
11	87.7	250	2.85	55	58.8	200	3.40	99	163.7	600	3.67	143	293.8	750	2.55
12	90.9			56	58.7			100	148.6	500	3.36	144	423.7	1050	2.48
13	85.8			57	89.2	300	3.36	101	173.3	600	3.46	145	177.0	450	2.54
14	109.2	250	2.29	58	131.9	400	3.03	102	328.0	900	2.74	146	178.3	450	2.52
15	95.3	250	2.62	59	128.3	400	3.12	103	105.8			147	149.0	400	2.68
16	158.7	400	2.52	60	143.3			104	366.9	900	2.45	148	108.9	300	2.76
17	151.4	400	2.64	61	152.1	450	2.96	105	403.9	1000	2.48	149	190.3	500	2.63
18	144.1	400	2.78	62	156.4			106	291.6	800	2.74	150	170.7	450	2.64
19	137.0	400	2.92	63	157.3	450	2.86	107	160.0	400	2.50	151	199.2	550	2.76
20	159.1	400	2.51	64	97.8	350	3.58	108	132.3	375	2.83	152	226.2	550	2.43
21	360.6	700	1.94	65	89.9	250	2.78	109	141.0	400	2.84	153	64.1	200	3.12
22	255.3	550	2.15	66	119.6	400	3.35	110	73.5		0.00	154	127.2	350	2.75
23	434.9	850	1.95	67	159.3	450	2.82	111	297.4	700	2.35	155	198.0	800	4.04
24	217.5	500	2.30	68	456.0	950	2.08	112	170.8	400	2.34	156	323.5	800	2.47
25	290.3	700	2.41	69	434.9	1000	2.30	113	136.2	400	2.94	157	170.7	400	2.34
26	125.7	250	1.99	70	206.6	450	2.18	114	132.7	400	3.01	158	332.0	800	2.41
27	292.6	550	1.88	71	212.9	500	2.35	115	124.3	350	2.81	159	480.7	1075	2.24
28	342.2	700	2.05	72	168.1	500	2.97	116	64.4			160	116.4	300	2.58
29	144.9	300	2.07	73	171.7	500	2.91	117	148.8	375	2.52	161	56.1	150	2.67
30	113.8	225	1.98	74	230.4	500	2.17	118	374.6	900	2.40	162	74.5	200	2.68
31	96.8	225	2.33	75	165.0	400	2.42	119	224.9	600	2.67	163	95.9	300	3.13
32	92.9	250	2.69	76	155.6			120	155.8	450	2.89	164	108.9	275	2.53
33	138.3	250	1.81	77	121.5	350	2.88	121	317.8	800	2.52	165	91.7	300	3.27
34	91.6	250	2.73	78	99.2	300	3.02	122	220.7	500	2.27	166	101.1	274	2.71
35	164.0	300	1.83	79	49.3	175	3.55	123	363.5			167	208.1	550	2.64
36	162.1	400	2.47	80	131.1			124	166.4	400	2.40	168	143.6	400	2.78
37	177.1	450	2.54	81	171.7			125	124.4	300	2.41	169	288.1	700	2.43
38	110.7	400	3.61	82	227.5			126	74.7	200	2.68	170	335.1	800	2.39
39	67.6	200	2.96	83	379.1	1000	2.64	127	110.8	250	2.26	171	225.2	600	2.66
40	64.8	200	3.09	84	276.4	750	2.71	128	273.5			172	208.7	500	2.40
41	59.8	175	2.93	85	242.4	600	2.48	129	84.0	250	2.98	173	102.5		
42	50.9	150	2.95	86	204.4	500	2.45	130	173.6	500	2.88	174	175.9	500	2.84
43	79.8	250	3.13	87	132.4	400	3.02	131	172.0	450	2.62	175	152.3		
44	77.6	225	2.90	88	213.3	500	2.34	132	99.9			176	122.4	350	2.86

FIGURES

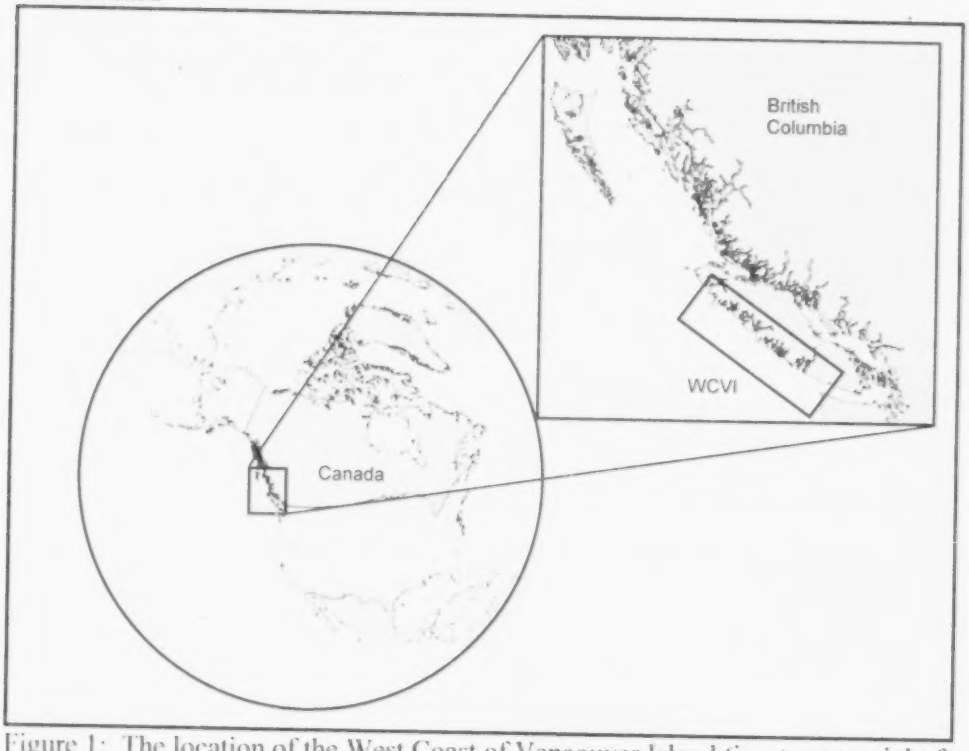

Figure 1: The location of the West Coast of Vancouver Island (inset, upper right frame) on the west coast of British Columbia, Canada.

Figure 2: The Government research trawler W.E. RICKER.

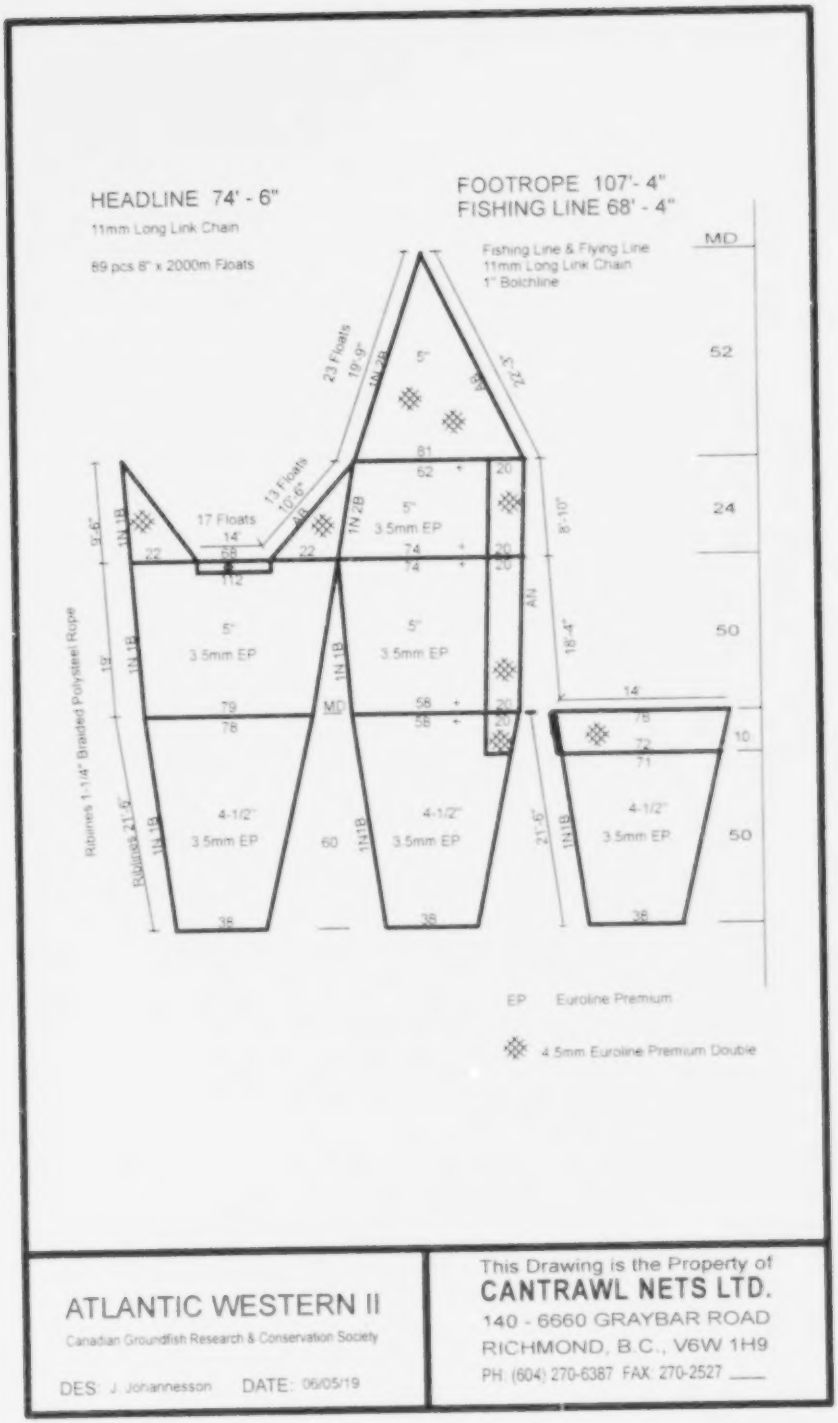

Figure 3: Atlantic western IIa used during the 2006 WCVI Bottom trawl survey.

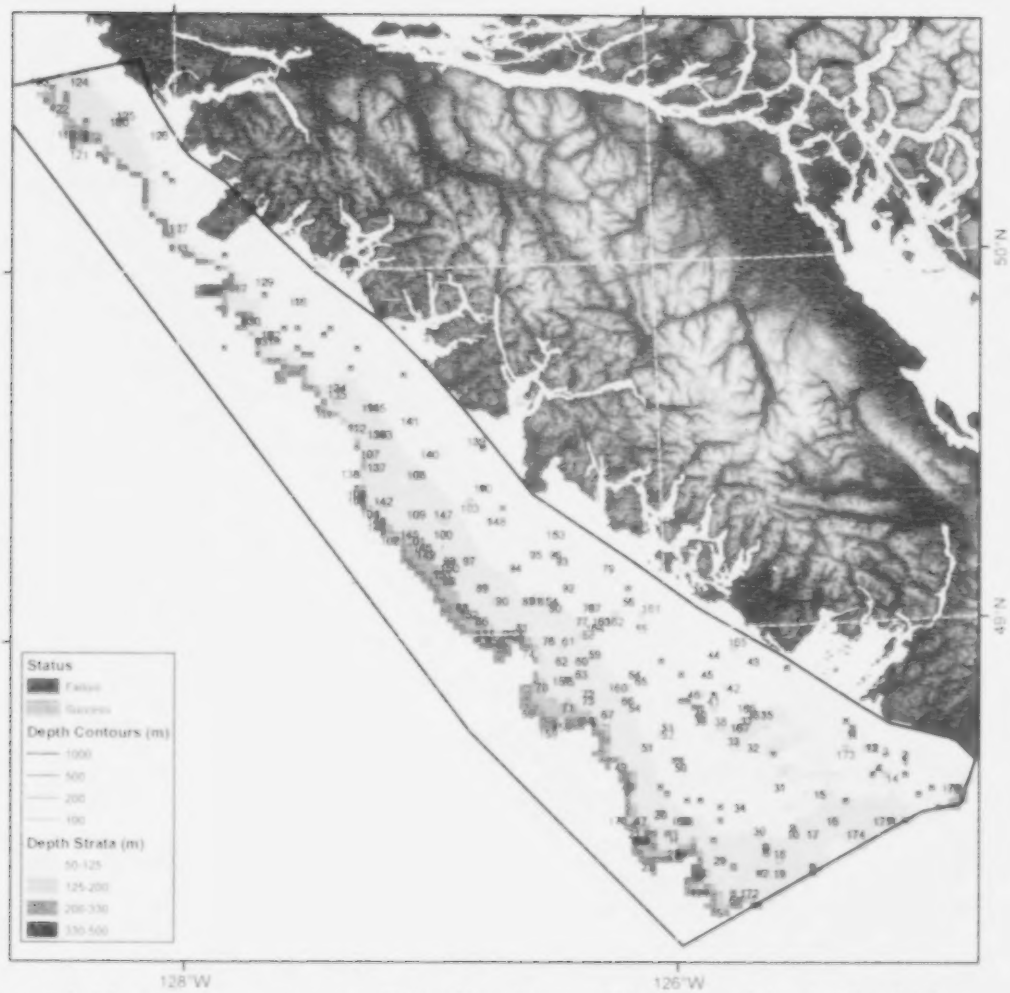

Figure 4: Map of the survey area off the West Coast of Vancouver Island. The thick black line outlines the survey frame; depth strata are represented by the four shades of blue; depth contours for 100, 200, 500, and 1000 m have been plotted. Survey blocks are shaded red or green depending on whether the site was successfully fished (green) or rejected (red), each block that was fished is labeled with its set number.

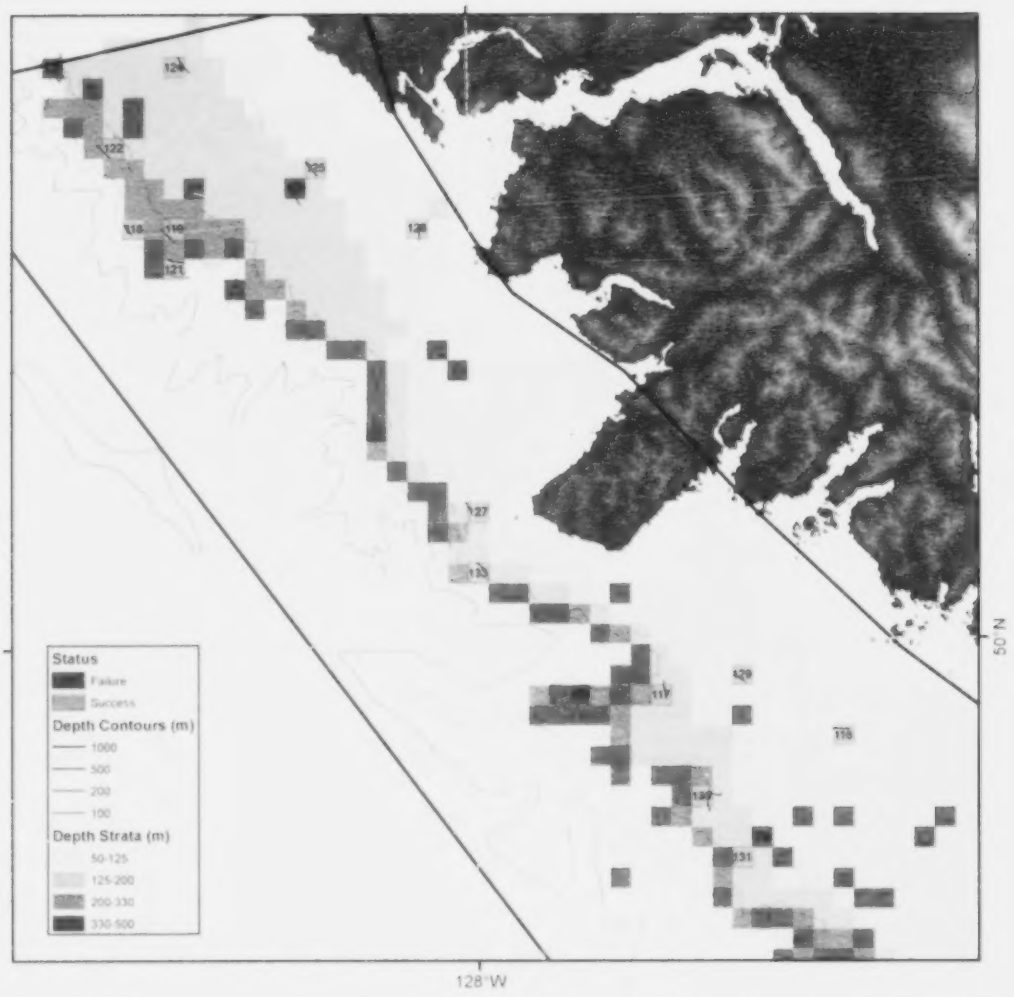

Figure 5: Detail view showing not only the blocks that were fished but also the track line of the tow, northern portion.

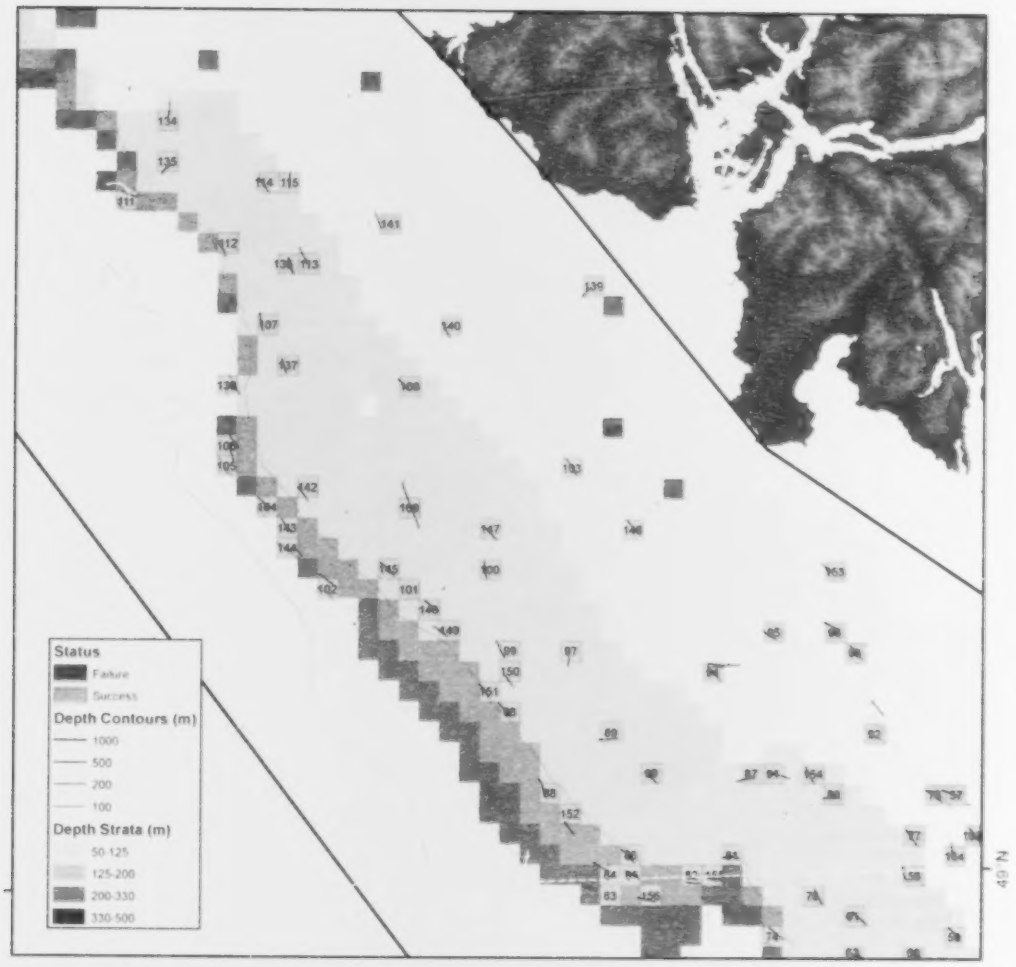

Figure 6: Detail view showing not only the blocks that were fished but also the track line of the tow, north central portion.

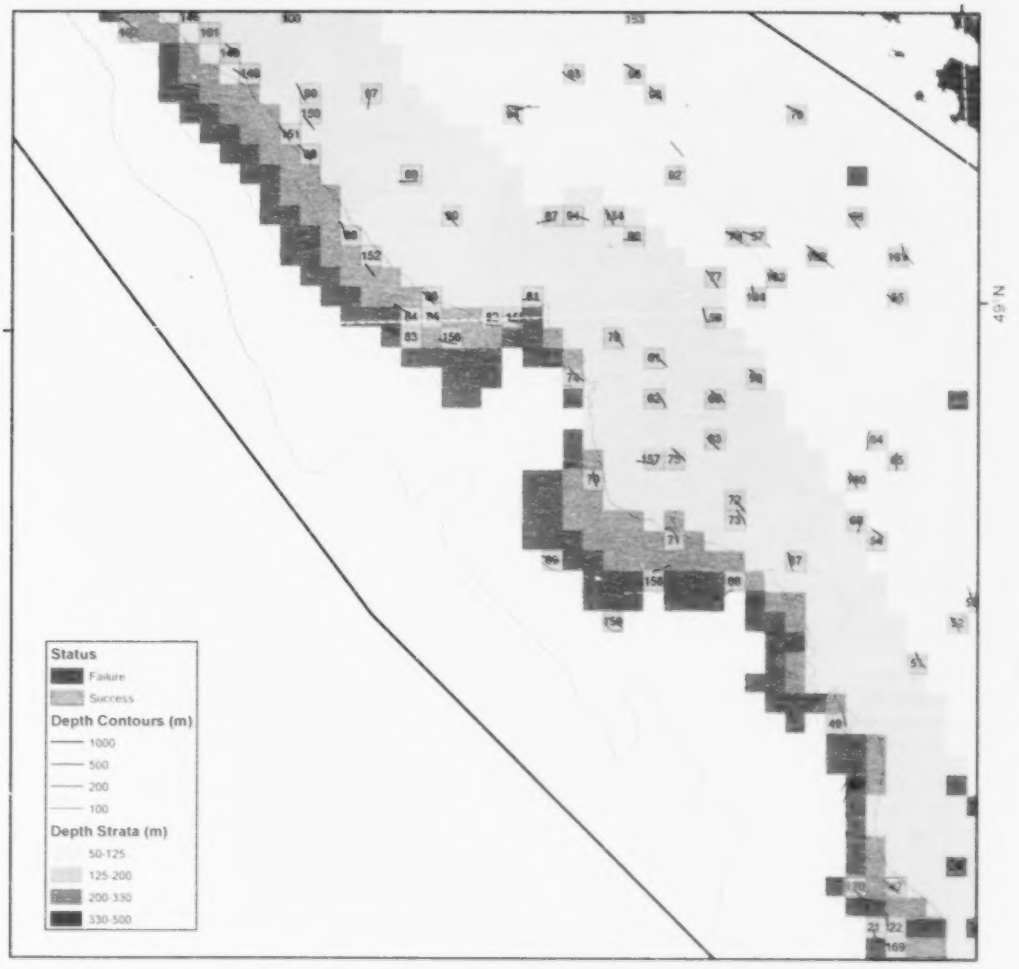

Figure 7: Detail view showing not only the blocks that were fished but also the track line of the tow, south central portion.

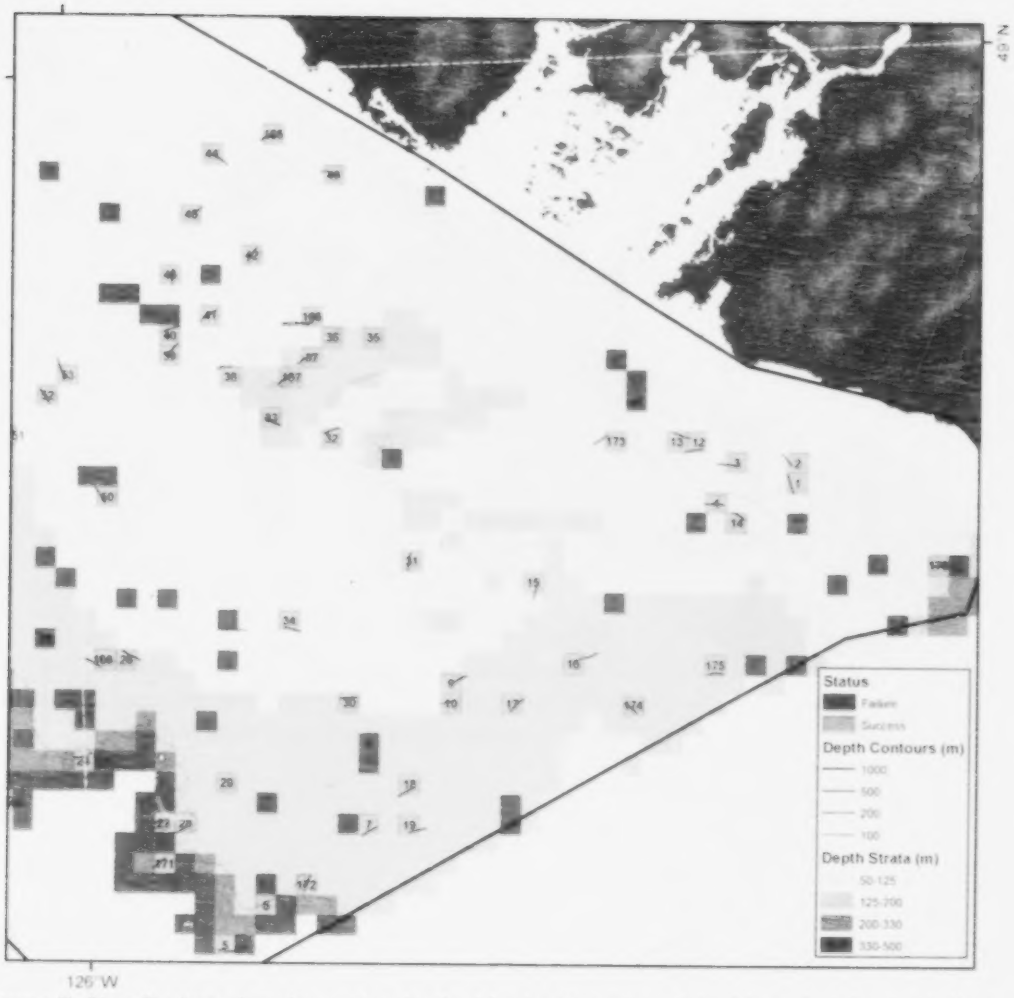

Figure 8: Detail view showing not only the blocks that were fished but also the track line of the tow, southern portion.

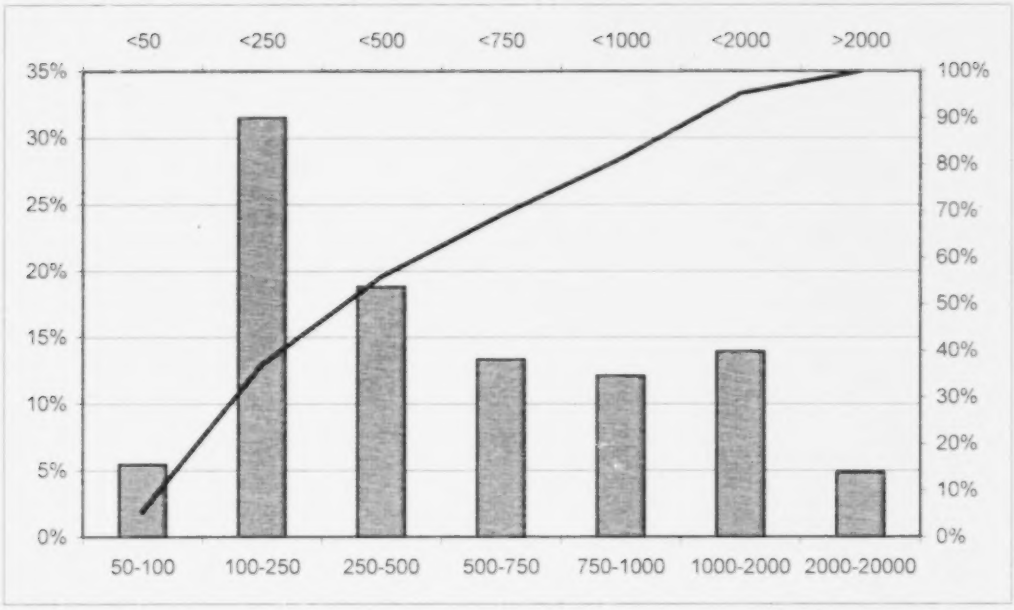

Figure 9: Distribution of catch size, bars represent the proportion (left y axis) of tows with a total catch weights by group (lower x axis). The line represents the cumulative catch proportion by the same bins plotted on the upper x axis and right y axis.

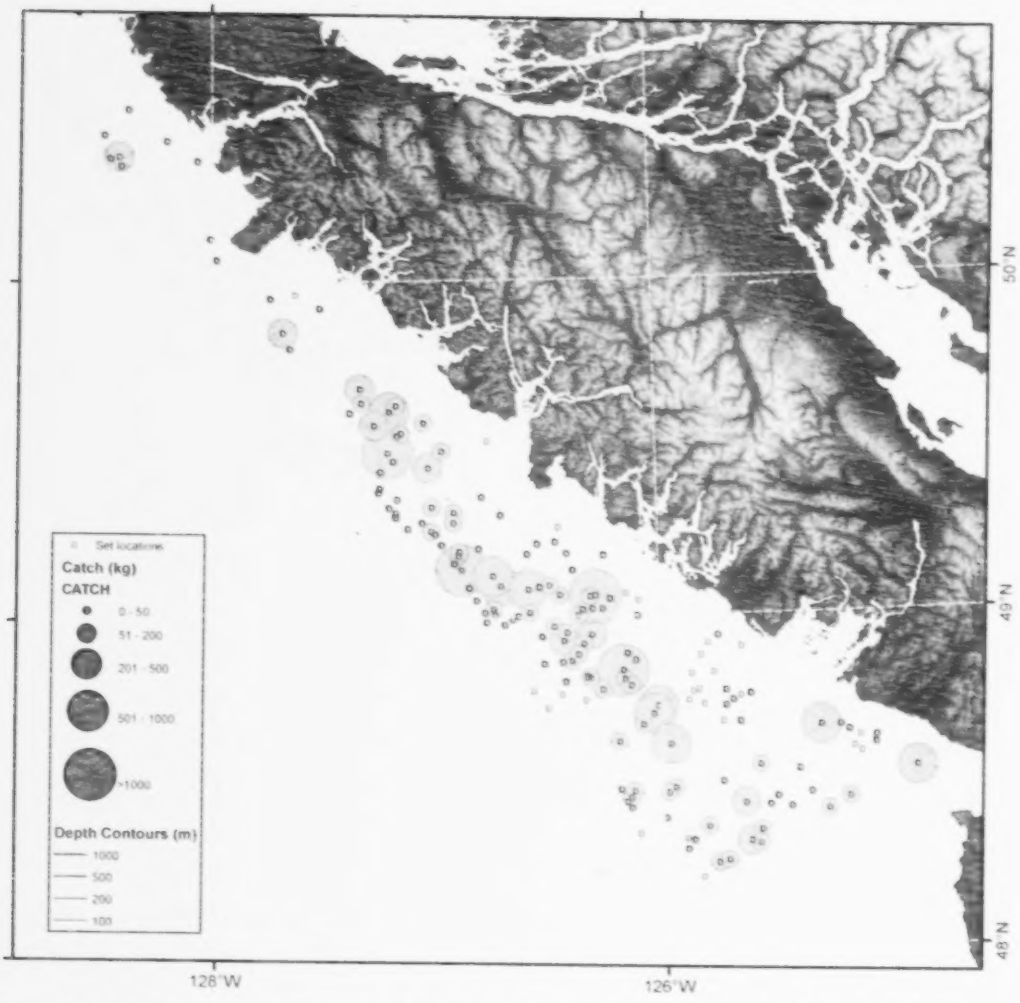

Figure 10: Distribution of spiny dogfish catches (kg), circles are scaled to catch size, sets with no catch are represented by the x symbol.

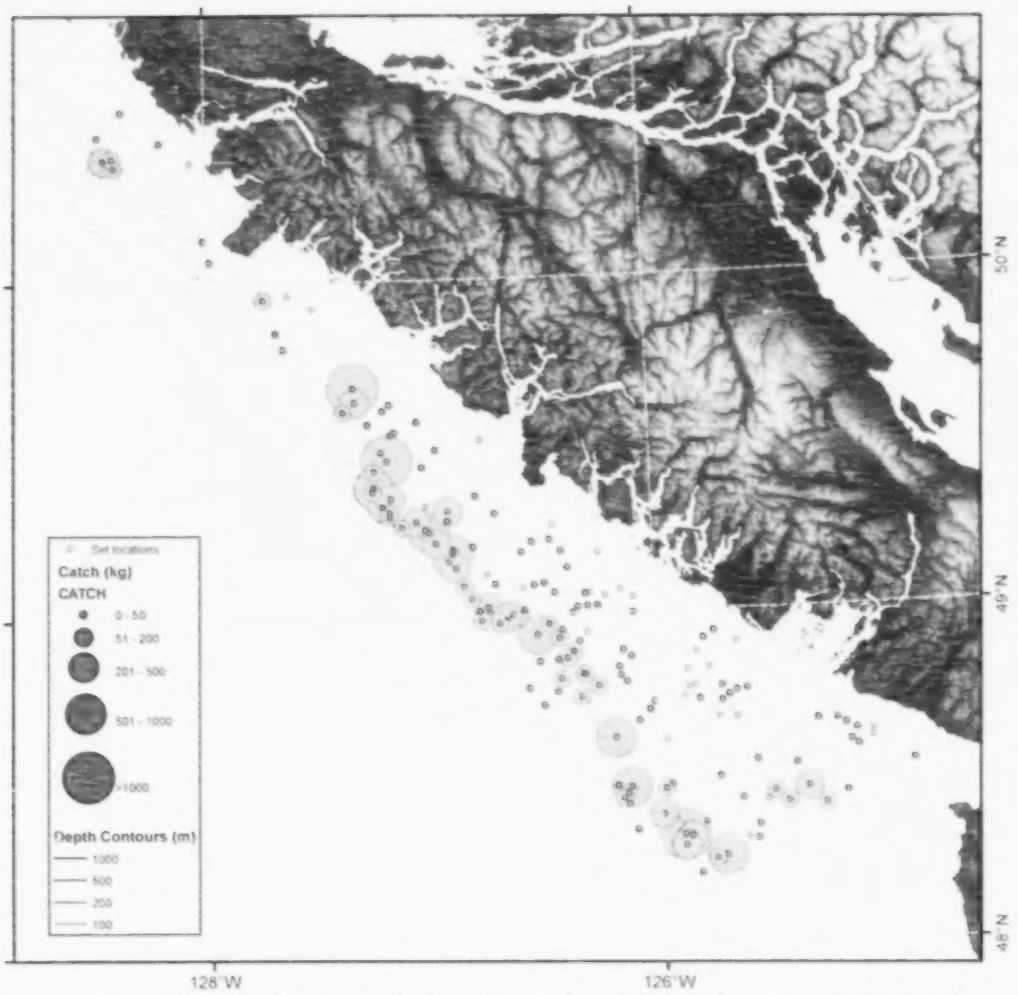

Figure 11: Distribution of arrowtooth flounder catches (kg), circles are scaled to catch size, sets with no catch are represented by the x symbol.

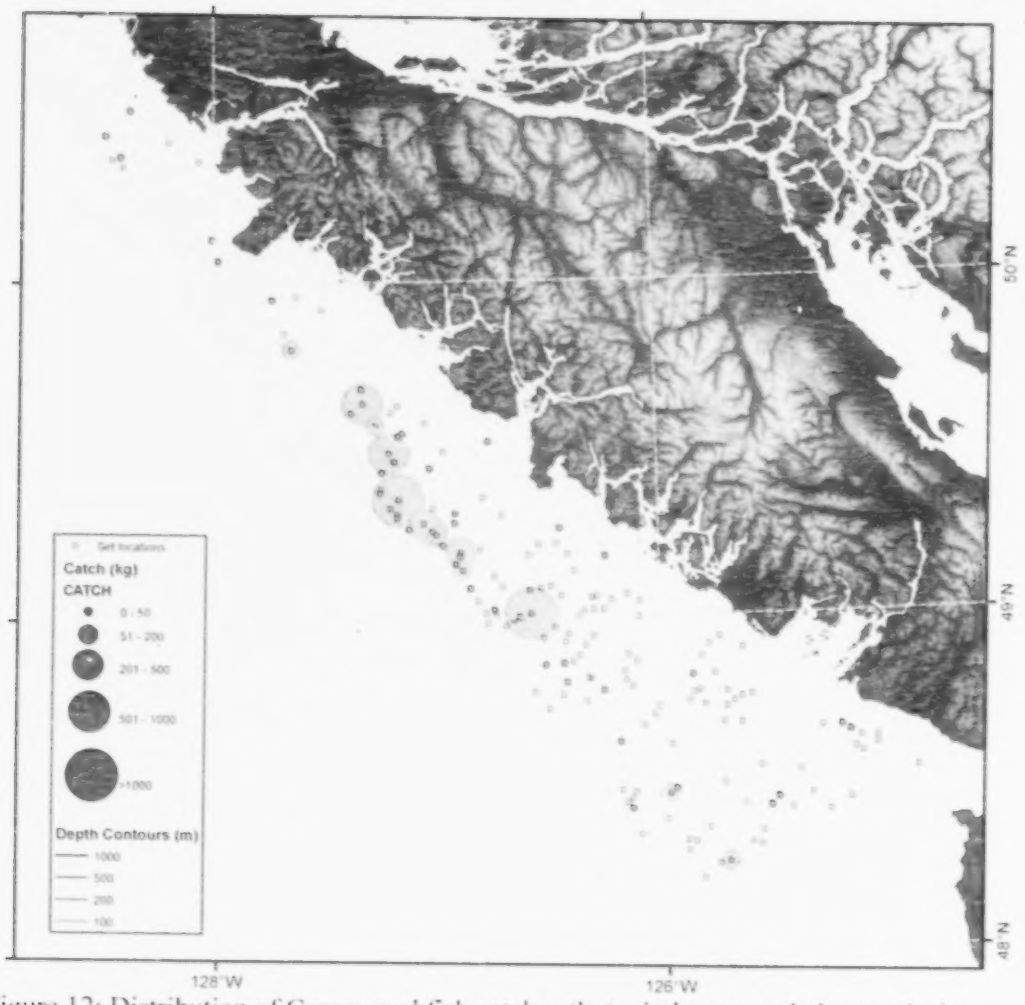

Figure 12: Distribution of Canary rockfish catches (kg), circles are scaled to catch size, sets with no catch are represented by the x symbol.

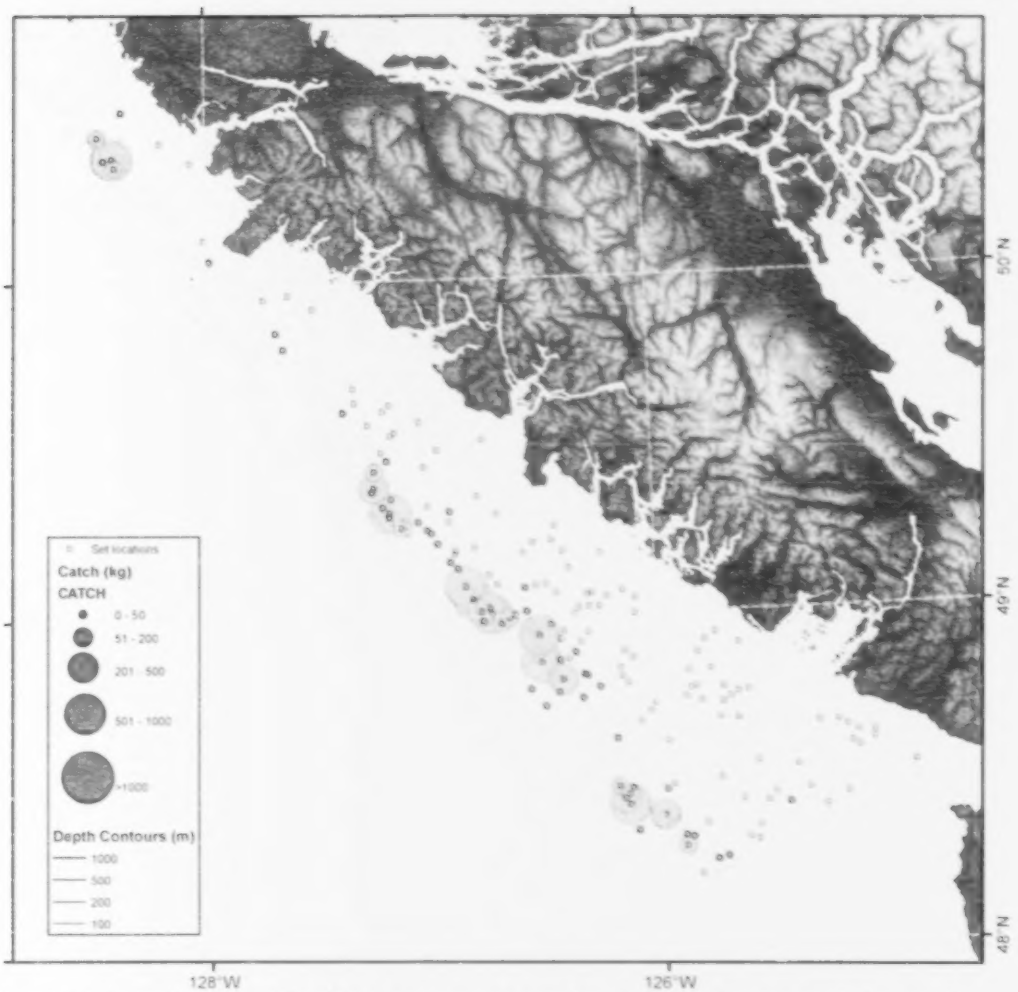

Figure 13: Distribution of Pacific Ocean perch catches (kg), circles are scaled to catch size, sets with no catch are represented by the x symbol.

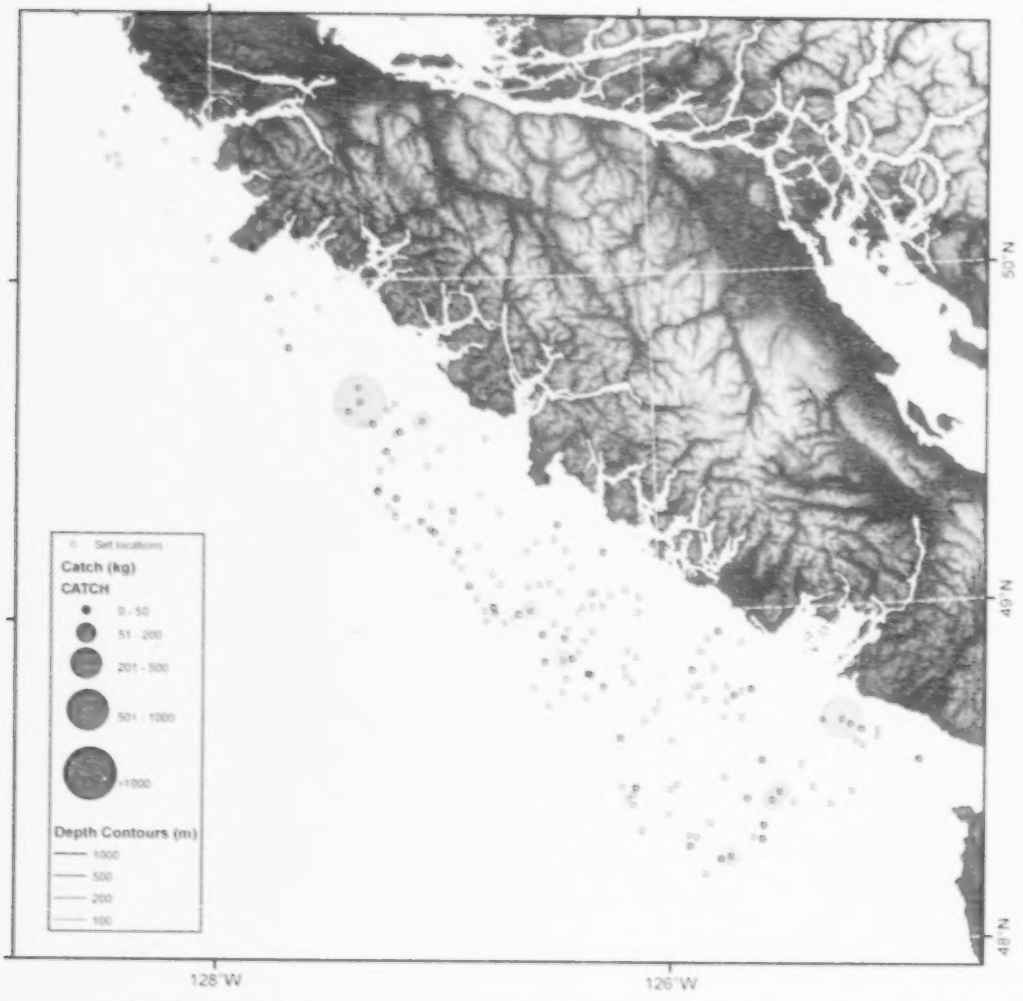

Figure 14: Distribution of Yellowtail rockfish catches (kg), circles are scaled to catch size, sets with no catch are represented by the x symbol.

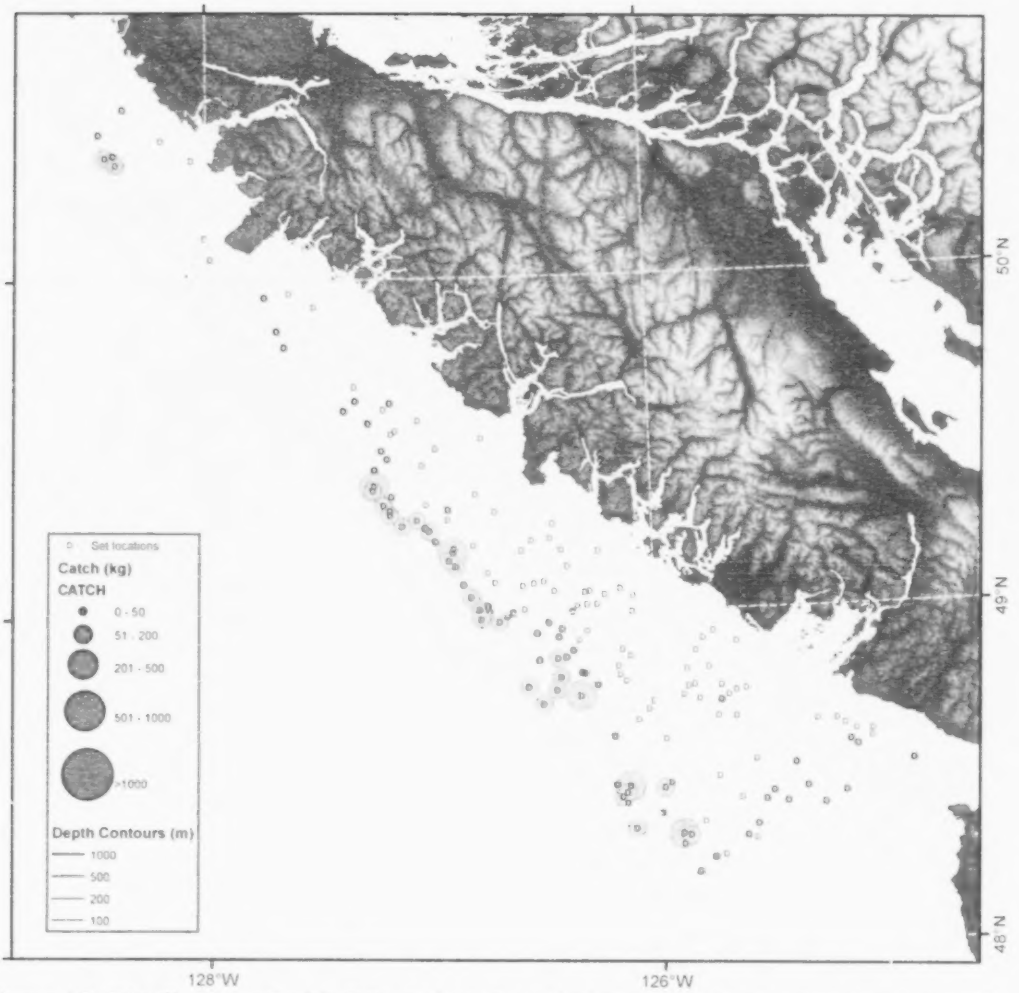

Figure 15: Distribution of sablefish catches (kg), circles are scaled to catch size, sets with no catch are represented by the x symbol.

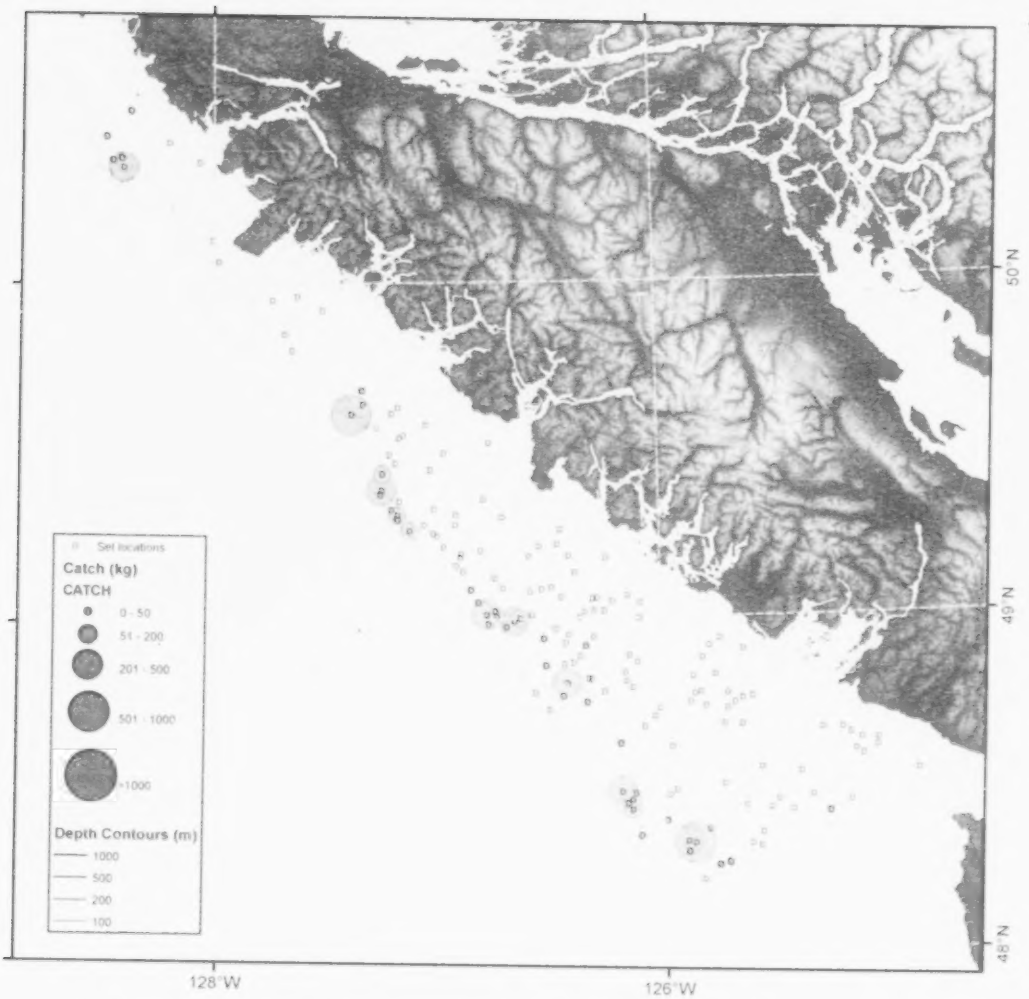

Figure 16: Distribution of Splitnose rockfish (kg), circles are scaled to catch size, sets with no catch are represented by the x symbol.

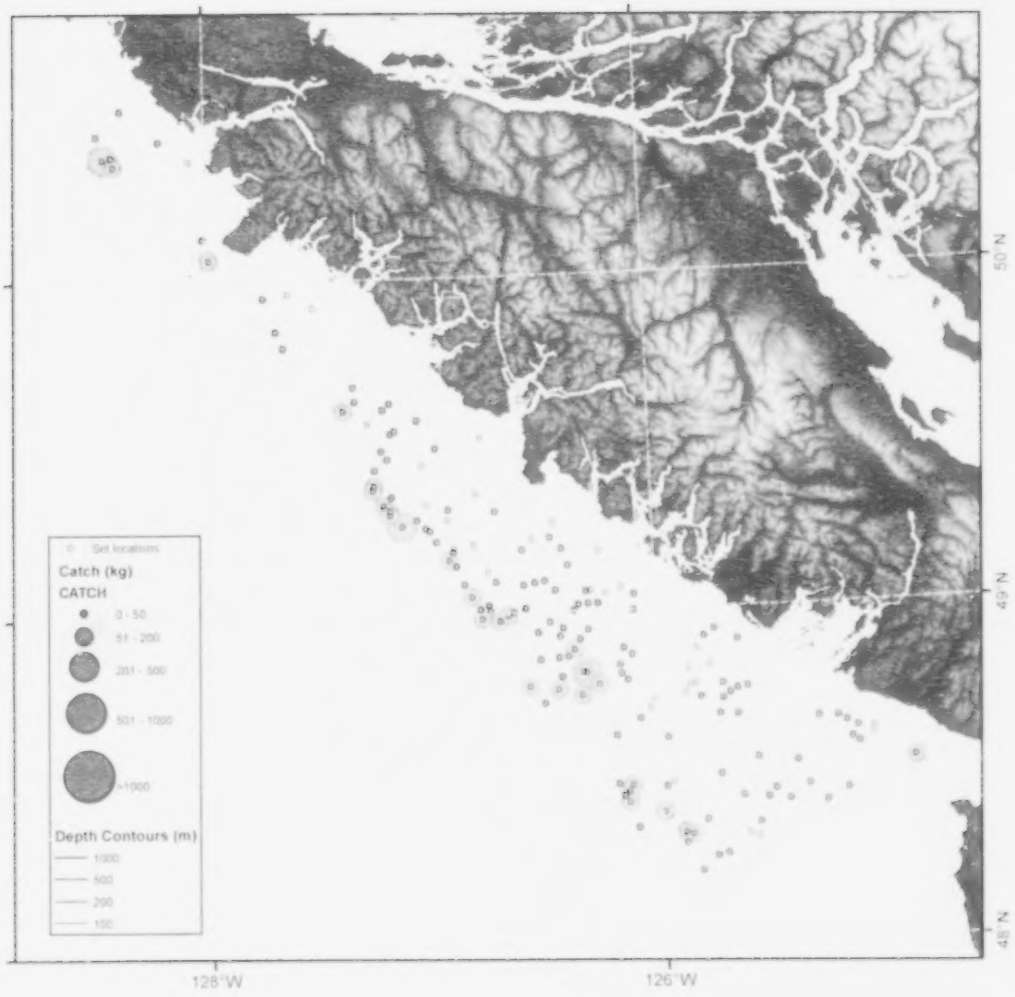

Figure 17: Distribution of Dover sole catches (kg), circles are scaled to catch size, sets with no catch are represented by the x symbol.

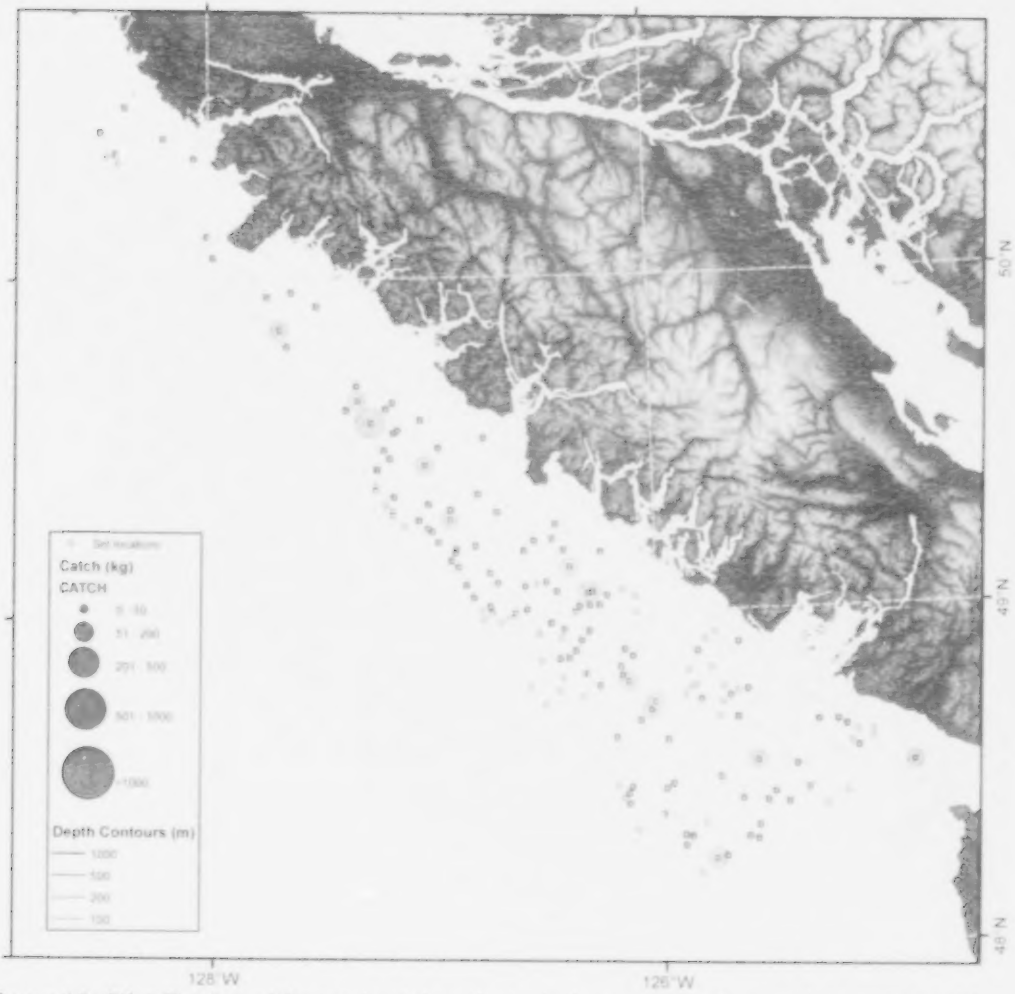

Figure 18: Distribution of lingcod catches (kg), circles are scaled to catch size, sets with no catch are represented by the x symbol.

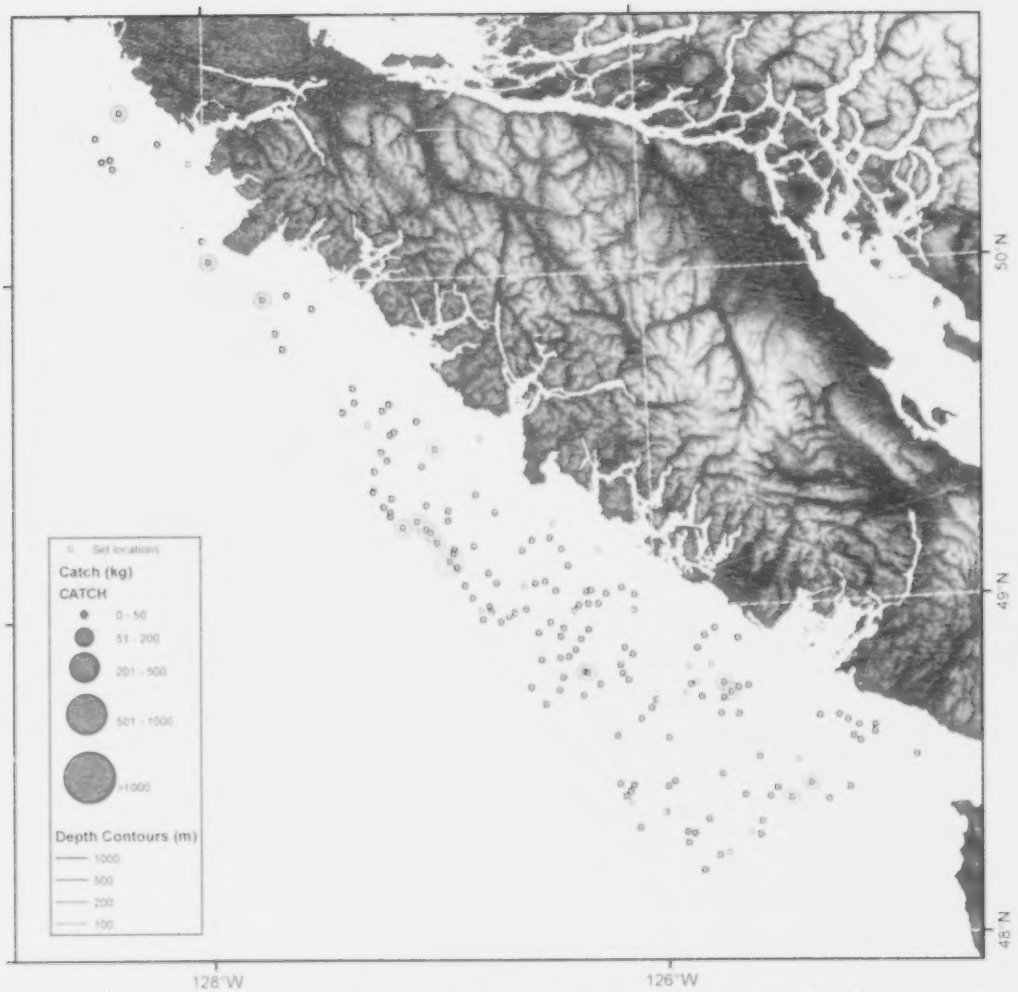

Figure 19: Distribution of rex sole catches (kg), circles are scaled to catch size, sets with no catch are represented by the x symbol.

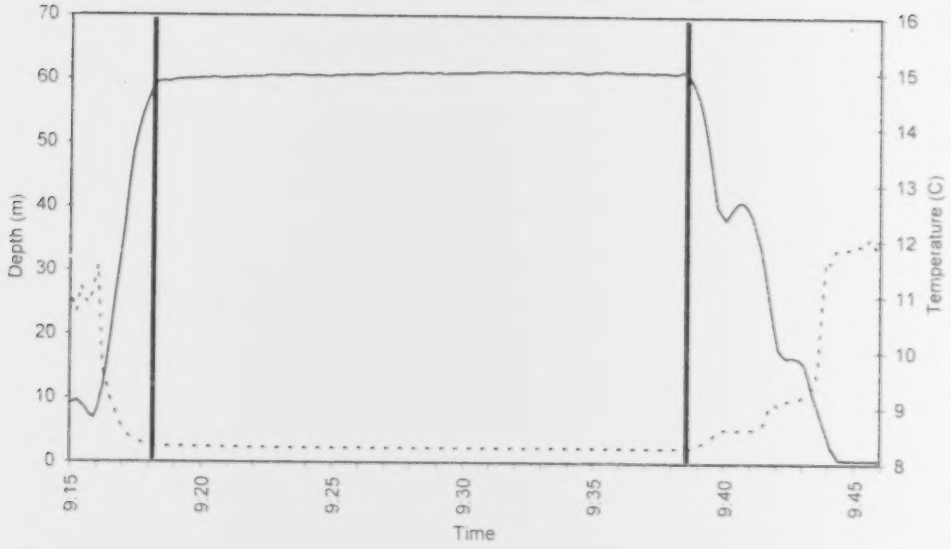

Figure 20: Example Seabird temperature and depth profile, the solid black line is depth and the dashed line is temperature, start and end bottom contact times are indicated by the vertical lines.

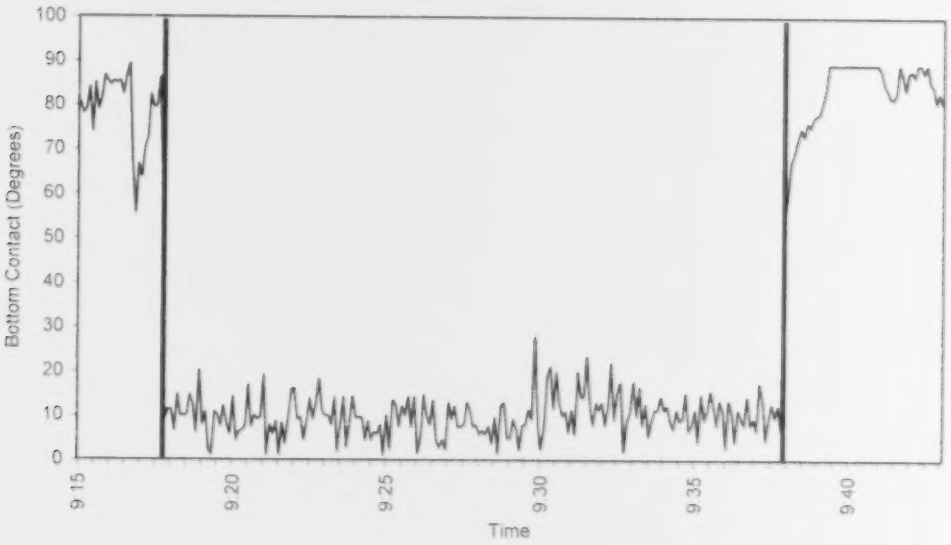

Figure 21: Bottom contact sensor trace for a tow on smooth mud or sand bottom. Start and end bottom contact times are indicated by the vertical lines.

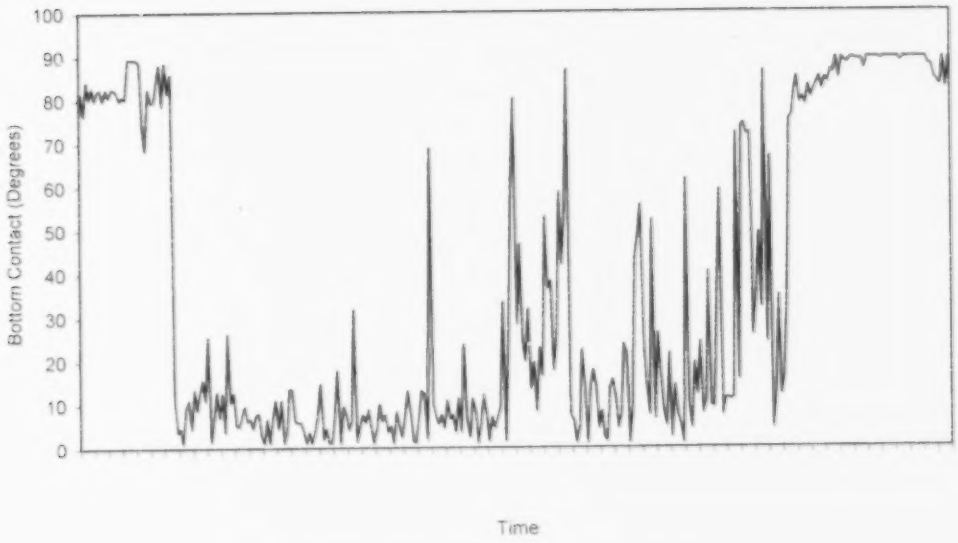

Figure 22: Bottom contact sensor trace for a set on rough bottom.

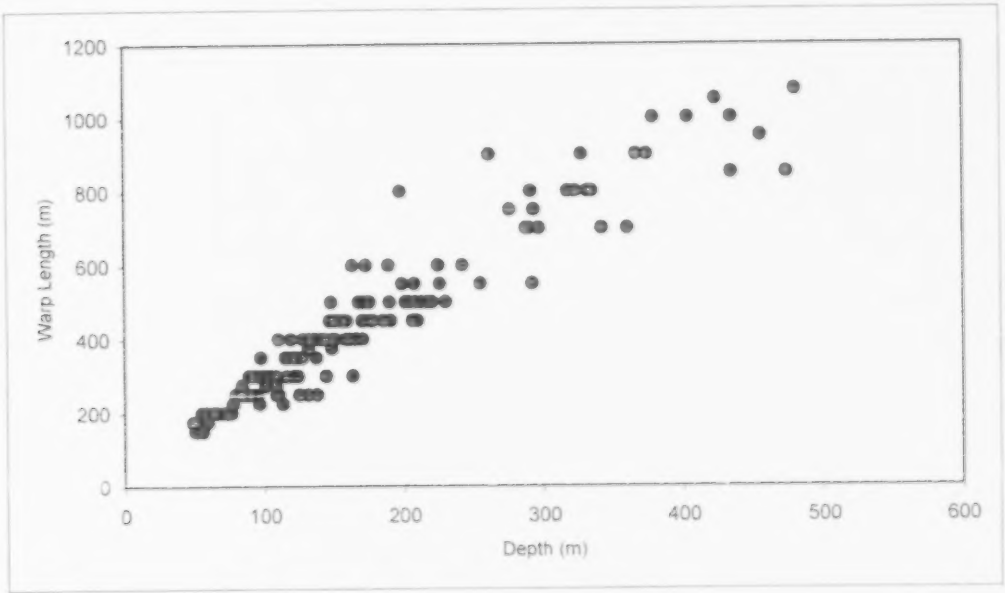

Figure 23: Plot of the length of main warp length deployed against the depth fished.

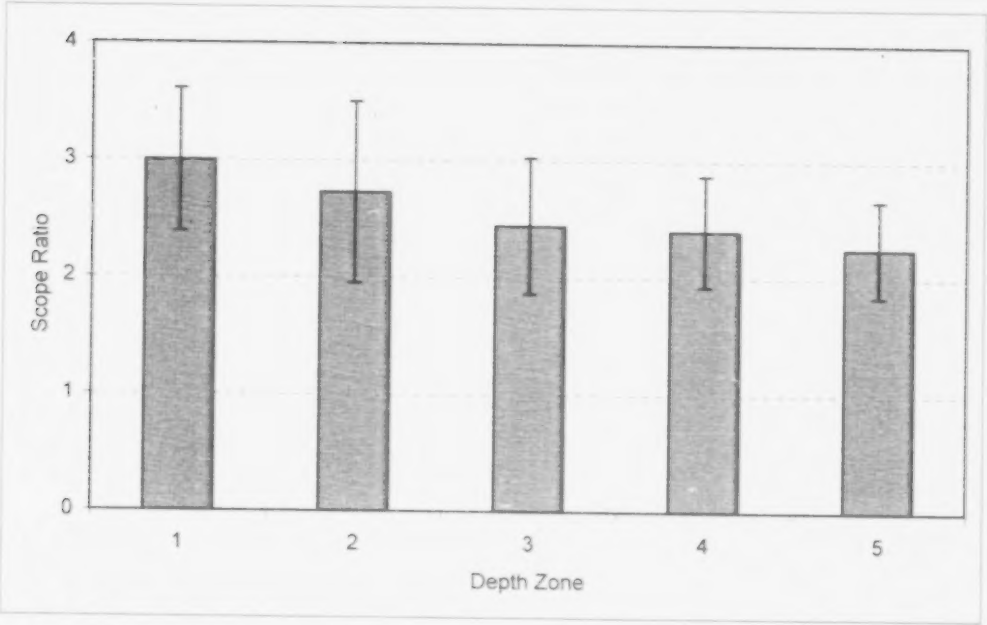

Figure 24: Mean scope ratio by depth zone. 1 = 0-100 m, 2= 101 – 200 m, 3 = 201 – 300 m, etc. Error bars are 1.96 standard deviations.

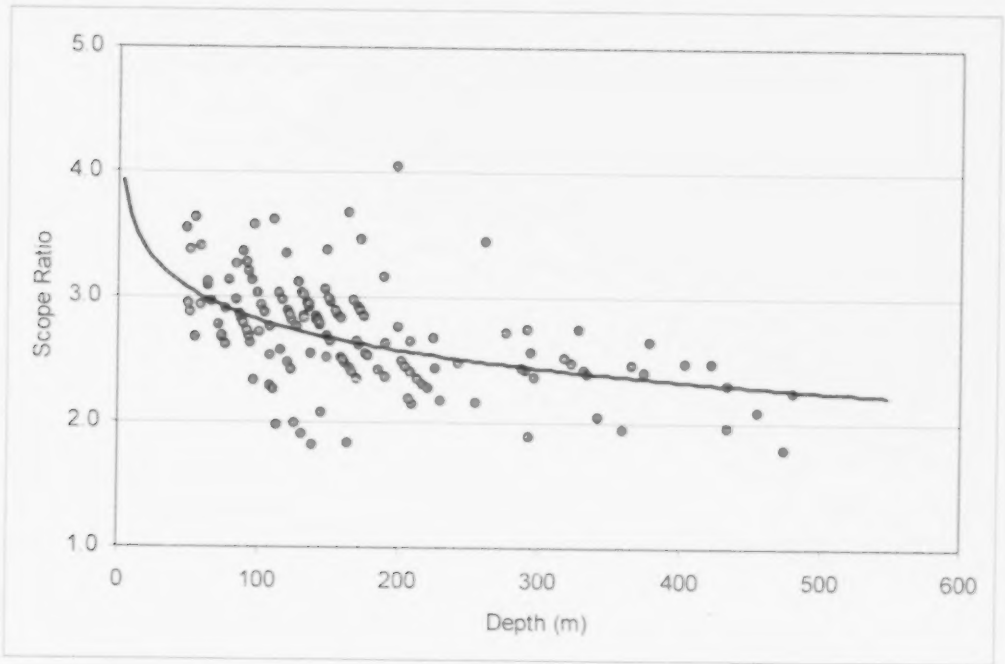

Figure 25: Plot of scope ratio and depth fished.

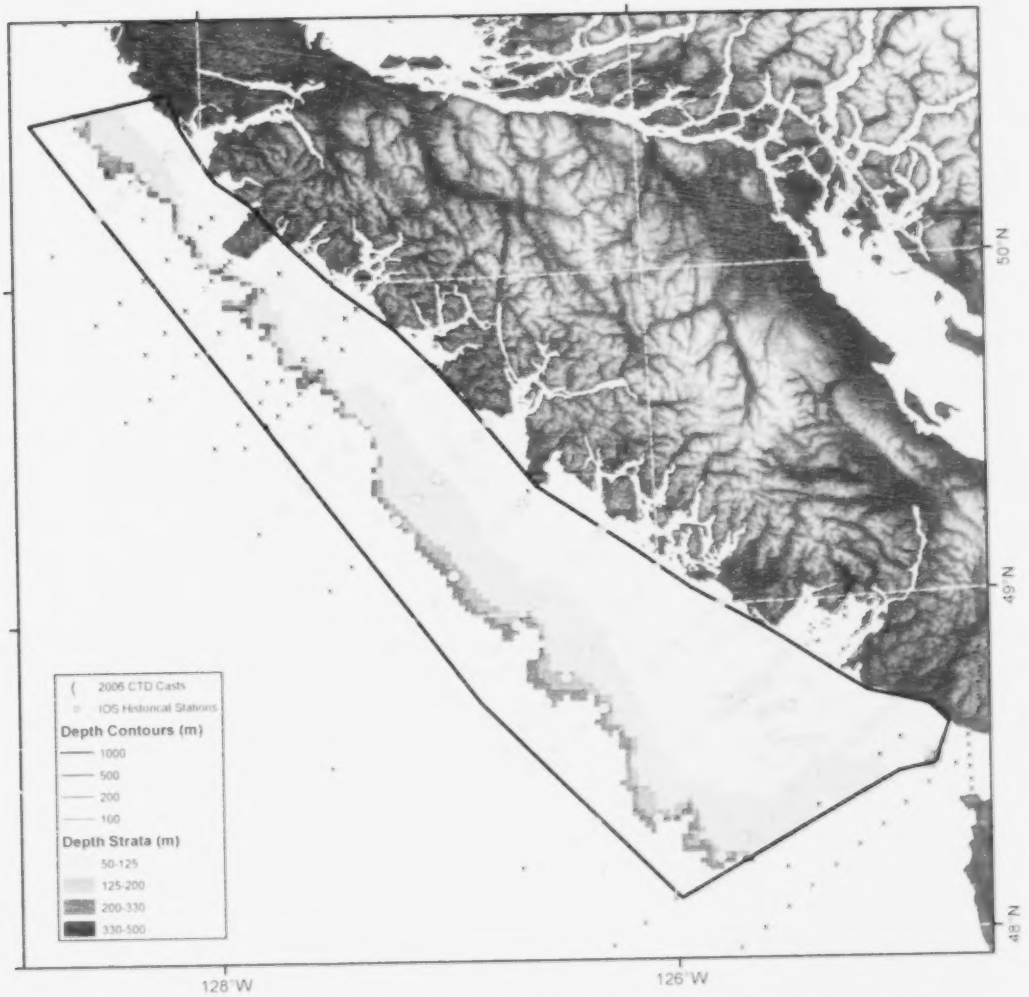

Figure 26: CTD stations occupied during the 2006 WCVI groundfish bottom trawl survey.

Figure 27: Example profile from the net mounted CTD showing depth, temperature, salinity, and dissolved oxygen levels during the deployment, while on the tow and during retrieval of tow 12.

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APPENDICES

Appendix 1: Criteria used to determine sole maturity stages.

Maturity stage	Code	Testes	Ovaries
Immature	1	Testes very small string–like and somewhat translucent or pinkish in colour.	Ovaries very small, translucent or pinkish in colour and somewhat gelatinous in texture.
Maturing	2	Testes enlarged, a distinct bulge evident but still translucent or pinkish in colour.	Ovaries relatively small, pinkish-yellow or cream in colour, granular in texture. No distinct eggs visible.
Developing	3	Testes enlarged, brown-white or white in colour, firm in texture.	Ovaries large, cream or yellow in colour, containing opaque eggs that can be distinguished by direct observation. Sex may be determined externally.
Running Ripe	4	Testes large, white and easily broken. No sperm evident.	Ovaries containing partly or wholly translucent eggs. Sex easily determined externally.
Spawning	5	Testes large, white and sperm evident.	Ovaries containing entirely translucent, mature ova. Eggs loose and will run from oviducts under slight pressure.
Spent	6	Testes flaccid, shrunken and yellow-brown in colour. Sperm ducts enlarged and a small amount of sperm may be present.	Ovaries large, flaccid and purple in colour; a few translucent eggs may be left. Ovarian membrane very bloodshot and sac-like.
Resting	7	Testes firm, small and yellow-brown in colour. Sperm ducts small.	Ovaries contracted and firm, pinkish-grey to cream-yellow in colour and may appear granular in texture but no distinct eggs are visible.

Appendix 2: Bridge Log details.

Tow	Date	Time	Latitude	Longitude	Depth (m)	Bottom Time (min)	Speed (km/h)	Warp (m)	Direction	Block	Catch (kg)	Usable?
1	5/24	13:47	48 36.54	125 2.71	75	21	5.7	200	347	3833	153.16	Yes
2	5/24	14:59	48 37.81	125 2.56	72	22	4.6	200	326	3981	89.62	Yes
3	5/24	16:06	48 37.96	125 6.88	84	22	6.5		275	3978	142.21	Yes
4	5/24	18:12	48 35.98	125 8.55	101	21	5.4		284	3681	90.73	Yes
5	5/25	7:45	48 13.32	125 49.85	470	22	5.2	850	95	401	71.53	Yes
6	5/25	9:15	48 15.86	125 45.63	184	24	6.3	450	226	699	428.29	Yes
7	5/25	10:59	48 19.58	125 36.85	134	20	5.9	350	240	1296	513.53	Yes
8	5/25	12:29	48 24.2	125 38.34	128	4	5.6	250	115	1888		No
9	5/25	17:44	48 27.41	125 29.39	137	19	5.2		242	2336	312.29	Yes
10	5/25	18:46	48 25.97	125 31.53	122	14	5.9	300	84	2188	292.61	No
11	5/26	7:19	48 41.21	125 14.37	85	6	5.2	250	12	4417		No
12	5/26	9:58	48 38.95	125 9.8	88	18	5.7		263	4124	177.73	Yes
13	5/26	11:08	48 39.92	125 12.03	83	20	5.6		113	4123	852.05	Yes
14	5/26	12:31	48 35.09	125 6.65	103	17	4.8	250	320	3534	178.84	Yes
15	5/26	14:38	48 32.23	125 23.37	91	21	4.8	250	197	3080	239.13	Yes
16	5/26	15:51	48 28.05	125 20.34	155	20	7	400	42	2490	683.12	Yes
17	5/26	17:41	48 25.53	125 25.85	156	19	5.4	400	50	2191	361.92	Yes
18	5/26	19:14	48 21.57	125 33.94	139	21	5.7	400	240	1594	220.23	Yes
19	5/26	20:08	48 19.2	125 34.46	134	21	5.2	400	80	1298	195.71	Yes
20	5/27	7:45	48 29.91	126 2.54	154	22	5.2	400	305	2612		No
21	5/27	10:39	48 27.01	126 9.72	330	17	5.6	700	176	2164	845.96	Yes
22	5/27	12:17	48 27.75	126 8.64	244	15	5.6	550	180	2165	563.18	Yes
23	5/27	13:52	48 21.38	126 6.32	428	21	6.1	850	90	1426	228.07	Yes
24	5/27	15:17	48 23.97	125 59.48	200	22	5.9	500	240	1726	972	Yes
25	5/27	16:31	48 23.92	125 58.99	256	17	6.3	700	200	1727		No
26	5/27	18:08	48 29.34	125 56.7	122	20	5.9	250	131	2468	189.79	Yes
27	5/28	7:15	48 19.89	125 52.06	276	19	5.9	550		1286	1352.4	Yes
28	5/28	8:23	48 20.25	125 53.88	324	14	5.7	700	265	1287	2579.6	Yes
29	5/28	10:00	48 22.3	125 48.06	141	20	6.1	300	241	1585	65.56	Yes
30	5/28	12:04	48 26.45	125 38.11	112	19	5.7	225	275	2183	517.07	Yes
31	5/28	13:47	48 33.15	125 33.83	87	19	4.6	225	25	3222	487.82	Yes
32	5/28	15:17	48 40.87	125 38.88	90	20	5.7	250	247	4106	175.1	Yes
33	5/28	16:06	48 41.07	125 43.59	136	18	6.1	250	300	4251	90.72	Yes
34	5/28	18:12	48 30.34	125 43.89	90	20	7	250	105	2772	265.65	Yes
35	5/29	7:09	48 45.82	125 35.98	158	20	5.6	300	259	4848	387.35	Yes
36	5/29	8:03	48 45.51	125 38.59	163	19	5	400	250	4846	359.81	Yes
37	5/29	8:57	48 44.76	125 40.62	174	21	5.7	450	244	4697	591.33	Yes
38	5/29	10:06	48 44.18	125 48.48	108	20	5.6	400	86	4545	303.39	Yes
39	5/29	11:11	48 44.97	125 52.58	67	20	5.2	200	47	4690	17.76	Yes
40	5/29	12:46	48 46.5	125 51.35	61	20	5.4	200	255	4838	51.46	Yes
41	5/29	13:37	48 46.76	125 49.74	59	20	6.1	175	60	4988	65.94	Yes
42	5/29	14:24	48 49.79	125 45.77	49	19	5.7	150	35	5434	48.94	Yes
43	5/29	15:34	48 54.27	125 38.21	71	21	5	250	284	6030	93.67	Yes
44	5/29	16:37	48 55.02	125 47.15	77	20	5	225	325	6172	230.06	Yes

Appendix 2: Continued

Tow	Date	Time	Latitude	Longitude	Depth (m)	Bottom Time (min)	Speed (km/h)	Warp (m)	Direction	Block	Catch (kg)	Usable?
45	5/29	17:50	48 52.84	125 49.23	50	21	4.6	175	234	5727	64.41	Yes
46	5/29	18:41	48 49.57	125 51.75	54	19	5.2	200	187	5282	99.54	Yes
47	5/30	7:14	48 28.87	126 7.64	205	21	5.7	450	308	2461	1097.74	Yes
48	5/30	8:47	48 34.86	126 11.39	641	4	5.6		230	3199	28.53	No
49	5/30	10:16	48 37.78	126 11.42	188	22	5.9	500	345	3642	2009.66	Yes
50	5/30	12:10	48 37.21	125 57.79	100	19	6.9	300	328	3651	703.3	Yes
51	5/30	13:16	48 40.74	126 4.94	118	22	7	300	320	4090	170.2	Yes
52	5/30	14:14	48 42.62	126 2.05	100	22	5.4	300	333	4388	797.51	Yes
53	5/30	15:07	48 43.97	126 0.73	85	22	5.7	250	342	4537	910.4	Yes
54	5/30	18:16	48 47.69	126 7.89	112	21	5.2	350	314	4976	279.77	Yes
55	5/31	8:41	49 0.05	126 5.8	60	20	5.4	200	310	6753	31.59	Yes
56	5/31	9:36	49 4.16	126 8.91	58	22	5.4		325	7343	24.24	Yes
57	5/31	10:44	49 3.82	126 17.06	88	22	5.6	300	296	7190	11363	Yes
58	5/31	13:24	49 0.27	126 21.82	128	23	5.6	400	172	6596	280.38	Yes
59	5/31	14:21	48 56.88	126 18.19	125	23	5.2	400	135	6154	476.1	Yes
60	5/31	15:17	48 55.2	126 20.35	139	21	6.1		313	6004	173.98	Yes
61	5/31	16:08	48 57.2	126 24.88	148	22	5.7	450	277	6297	166.6	Yes
62	5/31	17:45	48 55.8	126 25.75	153	21	5.6		150	6001	598.72	Yes
63	5/31	18:36	48 53.33	126 21.85	153	22	5.9	450	135	5708	372.91	Yes
64	6/1	7:13	48 53.42	126 8.7	94	21	5.2	350	177	5716	125.71	Yes
65	6/1	8:07	48 52.22	126 6.58	87	21	5.6	250	182	5569	286.56	Yes
66	6/1	9:09	48 48.85	126 9.54	115	23	5	400	200	5123	247.73	Yes
67	6/1	10:12	48 47.08	126 15.58	154	22	5.7	450	170	4824	493.17	Yes
68	6/1	11:16	48 45.21	126 20.22	453	21	5	950	240	4673	600.47	Yes
69	6/1	12:55	48 46.97	126 34.06	430	29	5.9	1000	291	4812	408.67	Yes
70	6/1	14:25	48 51.77	126 31.08	205	20	5.4	450	170	5406	887.7	Yes
71	6/1	15:37	48 48.53	126 25.39	212	23	4.8	500	100	4966	864.18	Yes
72	6/1	17:43	48 49.23	126 18.9	163	22	5.4	500	322	5265	579.32	Yes
73	6/1	18:32	48 49.4	126 19.62	166	23	5.6	500	141	5117	572.4	Yes
74	6/2	7:15	48 56.56	126 31.6	209	19	5.7	500	312	6145	1850.66	Yes
75	6/2	9:18	48 52.13	126 23.66	161	21	5.6	400	140	5558	389.27	Yes
76	6/2	10:27	48 58.37	126 28.41	153	20	5.6		336	6443	448.79	Yes
77	6/2	11:55	49 1.3	126 20.55	118	22	5.4	350	324	6892	102.79	Yes
78	6/2	12:49	49 3.62	126 18.46	97	21	6.1	300	310	7189	327.85	Yes
79	6/2	14:07	49 10.88	126 14.67	49	21	5.7	175	120	8080	197.73	Yes
80	6/3	8:19	49 3.96	126 26.67	128	23	5.2		280	7184	148.95	Yes
81	6/3	9:34	49 0.87	126 34.77	184	24	5.4		274	6735	2692.68	Yes
82	6/3	10:41	48 59.75	126 39.45	213	21	4.6		96	6585	921.34	Yes
83	6/3	12:19	48 59.28	126 46.43	368	27	5.4	1000	300	6433	869.43	Yes
84	6/3	14:02	49 0.96	126 46.86	270	26	5.9	750	130	6581	886.68	Yes
85	6/3	15:01	49 0.44	126 44.25	237	23	5.9	600	123	6582	1191.36	Yes
86	6/3	16:09	49 1.59	126 44.62	199	26	5.4	500	125	6730	1060.16	Yes
87	6/3	18:06	49 5.01	126 35.09	129	24	5.6	400	81	7328	690.58	Yes
88	6/4	7:07	49 5.43	126 51.08	206	21	5.2	500	164	7170	1435.11	Yes

Appendix 2: Continued

Tow	Date	Time	Latitude	Longitude	Depth (m)	Bottom Time (min)	Speed (km/h)	Warp (m)	Direction	Block	Catch (kg)	Usable?
89	6/4	8:25	49 7.45	126 44.65	138	23	5.6	400	268	7617	604.75	Yes
90	6/4	9:23	49 5.69	126 42.54	143	23	5.6	450	135	7323	846.08	Yes
91	6/4	10.33	49 5.38	126 32.16	128	22	5.4	375	107	7329	49.54	Yes
92	6/4	12:06	49 8.3	126 23.03	92	23	5.4	300	320	7630	230.01	Yes
93	6/4	12:56	49 11.34	126 24.64	82	23	5.9	275	320	8221	160.17	Yes
94	6/4	14:40	49 11.29	126 35.36	114	23	5.7	350	260	8066	50.1	Yes
95	6/4	15:44	49 13.04	126 32.63	102	22	5.4	300	133	8365	121.19	Yes
96	6/5	7:25	49 13.38	126 27.72	82	22	5.6	250	120	8368	149.14	Yes
97	6/5	9:32	49 12.35	126 48.32	131	23	5.4	400	190	8207	77.58	Yes
98	6/5	10:40	49 8.63	126 53.06	183	26	5.6	600	320	7760	2364.82	Yes
99	6/5	12:09	49 11.86	126 53.58	159	23	5.6	600	330	8204	394.98	Yes
100	6/5	13:20	49 17.08	126 55.11	144	24	5.6	500	175	8795	197	Yes
101	6/5	14:26	49 15.59	127 1.12	168	25	5.7	600	277	8643	1415.4	Yes
102	6/5	15:28	49 16.01	127 7.43	325	26	4.8	900	310	8639	977.55	Yes
103	6/5	18:08	49 21.5	126 47.45	103	22	5.6		330	9539	123.06	Yes
104	6/6	7:17	49 19.73	127 12.36	364	31	5.7	900	315	9228	942.61	Yes
105	6/6	8:27	49 22.52	127 15.26	392	27	5.2	1000	342	9522	687.55	Yes
106	6/6	9:48	49 23.21	127 14.81	280	27	5.9	800	336	9670	1975.1	Yes
107	6/6	11:02	49 29.53	127 12.71	158	21	5.4	400	350	10560	2029.69	Yes
108	6/6	13:00	49 26.82	127 1.79	129	23	5	375	135	10123	459.3	Yes
109	6/6	14:33	49 19.84	127 0.94	137	22	6.1	400	347	9235	93.56	Yes
110	6/6	16:29	49 23.53	126 44.54	72	6				9837		No
111	6/7	7:08	49 36.75	127 22.9	240	21	5	700	290	11441	1539.61	Yes
112	6/7	8:40	49 34.45	127 16.3	161	23	5.6	400	157	11150	1113.05	Yes
113	6/7	9:54	49 33.06	127 8.99	132	22	5.7	400	334	11006	176.63	Yes
114	6/7	10:52	49 36.88	127 12.08	129	22	5.6	400	323	11596	654.04	Yes
115	6/7	12:08	49 37.97	127 10.26	120	22	5.7	350	180	11597	256.77	Yes
116	6/8	7:30	49 55.3	127 30.7	65	21	5.2		90	13953	55.47	Yes
117	6/8	9:53	49 57.05	127 44.28	146	23	5.9	375	352	14240	515.38	Yes
118	6/8	15:22	50 22.11	128 28.05	370	21	6.1	900	325	17618	1068.42	Yes
119	6/8	16:21	50 22.43	128 25.76	218	24	5.7	600	135	17620	1306.62	Yes
120	6/8	17:47	50 24.48	128 14.87	150	22	5.7	450	151	17922		No
121	6/9	8:00	50 20.8	128 25.12	312	24	5.2	800	100	17324	1205.54	Yes
122	6/9	9:28	50 26.21	128 29.84	214	21	5.6	500	320	18209	335.21	Yes
123	6/9	10:36	50 30.4	128 34.21	410	0				18798		No
124	6/9	12:18	50 30.75	128 23.2	161	22	5.4	400	314	18804	200.67	Yes
125	6/9	14:59	50 25.16	128 12.6	121	21	5.6	300	323	18071	212.27	Yes
126	6/9	16:29	50 21.55	128 4.19	71	18	5	200	5	17632	71.03	Yes
127	6/9	19:15	50 7.67	128 0.61	106	14	6.1	250	145	15563	94.9	Yes
128	6/10	7:14	49 57.54	127 51.04	217	6	4.6		290	14236	858.09	No
129	6/10	9:05	49 57.8	127 37.55	80	19	5.4	250		14392	36.48	Yes
130	6/10	10:36	49 51.02	127 40.91	168	23	5.2	500	13	13502	828.49	Yes
131	6/10	12:16	49 48.2	127 38.98	166	22	5	450	350	13060	954.45	Yes
132	6/10	14:42	49 49.85	127 36.13	94	7				13209		No

Appendix 2: Continued

Tow	Date	Time	Latitude	Longitude	Depth (m)	Bottom Time (min)	Speed (km/h)	Warp (m)	Direction	Block	Catch (kg)	Usable?
133	6/10	18:06	50 3.97	127 59	186	16	5.6		315	15119	387.83	Yes
134	6/12	11:21	49 41.02	127 20.11	138	19	5.4		4	12035	1687.97	Yes
135	6/12	13:01	49 38.44	127 19.72	146	19	5.7	450	240	11739	6210.62	Yes
136	6/12	14:46	49 32.54	127 10.16	138	21	5.4	400	340	11005	120.59	Yes
137	6/12	15:57	49 28.06	127 11.17	154	19	5.9	400	185	10265	1422.18	Yes
138	6/12	17:43	49 26.16	127 14.69	224	18	5.6	900	325	10114	611.72	Yes
139	6/13	7:11	49 31.48	126 45.85	50	16	5.2	150	226	10872	34.71	Yes
140	6/13	8:39	49 29.8	126 58.06	107	19	5		156	10569	327.83	Yes
141	6/13	9:56	49 34.83	127 2.86	106	21	5.6	300	338	11306	233.79	Yes
142	6/13	12:08	49 21.24	127 10.19	180	23	5	450	145	9378	4715.26	Yes
143	6/13	13:33	49 18.76	127 10.71	337	24	5.2	750	330	9081	1037.54	Yes
144	6/13	14:40	49 18.04	127 10.71	413	19	6.1	1050	130	8933	604.87	Yes
145	6/13	15:56	49 17.08	127 3.52	171	22	5.9	450	135	8790	1123.09	Yes
146	6/13	16:46	49 15.02	127 0.01	174	23	4.8	450	130	8496	925.4	Yes
147	6/13	18:05	49 18.81	126 55	145	21	5.6	400	140	9091	671.79	Yes
148	6/14	7:42	49 18.27	126 42.42	107	20	5.6	300	320	9098	144.56	Yes
149	6/14	9:33	49 13.12	126 58.26	185	22	5.4	500	307	8349	673.27	Yes
150	6/14	10:43	49 11.13	126 53.83	166	24	5	450	144	8056	1425.28	Yes
151	6/14	12:04	49 9.8	126 54.95	192	23	4.6	550	330	7907	984.71	Yes
152	6/14	13:38	49 3.21	126 49.12	220	24	5.4	550	150	7023	1775.44	Yes
153	6/14	16:23	49 15.98	126 26.83	61	17	6.3	200	310	8812	29.72	Yes
154	6/15	7:12	49 5.67	126 29.44	123	22	5.2	350	154	7331	110.21	Yes
155	6/15	8:44	49 0.27	126 37.93	191	26	4.6	800	111	6586	678.8	Yes
156	6/15	9:53	48 58.72	126 41.58	316	25	5.6	800	284	6435	492.35	Yes
157	6/15	12:15	48 52.02	126 26.13	166	22	5.2	400	280	5557	1869.65	Yes
158	6/15	13:41	48 46.3	126 26.56	319	26	6.1	800	80	4669	408.21	Yes
159	6/15	15:12	48 43.95	126 30.28	470	29	5	1075	140	4371	192.61	Yes
160	6/15	17:35	48 50.39	126 9.87	113		6.1	300	330	5419	1261.85	Yes
161	6/16	7:12	49 2.84	126 5.47	55		4.3	150	138	7049	30.67	Yes
162	6/16	8:32	49 3.16	126 13.11	72	22	4.8	200	125	7045	78.71	Yes
163	6/16	9:27	49 1.43	126 15.28	92	22	5	300	320	6895	395.33	Yes
164	6/16	10:20	49 1.46	126 17.86	106	16	4.6	275	170	6746	398.9	Yes
165	6/16	13:39	48 56.28	125 44.38	88	22	5.4	300	70	6323	163.15	Yes
166	6/16	15:44	48 46.51	125 42.54	97	21	6.1	274	100	4993	219.35	Yes
167	6/16	16:43	48 43.79	125 42.56	199	24	5.7	550	230	4548	320.04	Yes
168	6/17	9:55	48 28.52	125 58.5	138	22	5.2	400	301	2467	692.55	Yes
169	6/17	11:22	48 25.92	126 8.5	280	24	4.8	700	315	2017	978.72	Yes
170	6/17	13:10	48 29.21	126 11.3	333	24	5.2	800	150	2459	616.49	Yes
171	6/17	15:31	48 18.36	125 53.72	216	24	4.6	600	230	990	997.31	Yes
172	6/17	17:36	48 16.31	125 42.92	230	23	5	500	27	849	1585.3	Yes
173	6/18	7:05	48 39.96	125 17.23	100	22	5		242	4120	773.28	Yes
174	6/18	9:29	48 25.04	125 15.85	174	22	5	500	311	2197	362.29	Yes
175	6/18	10:34	48 27.01	125 10.15	149	19			93	2497	267.36	Yes
176	6/18	12:48	48 32.13	124 51.91	116	23	5.4	350	80	3248	1422.13	Yes

Appendix 3: Tow by Tow catch details for the most common 50 species encountered during the survey.

Species	1	2	3	4	5	6	7	8	9	10
American shad	-	-	1.28	0.20	-	-	-	-	-	-
Arrowtooth flounder	-	-	1.37	21.92	2.00	90.00	-	-	71.04	-
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	-	-
Bigfin eelpout	-	-	-	-	-	-	-	-	-	-
Black eelpout	-	-	-	-	0.30	-	-	-	-	-
Bocaccio	-	-	-	-	-	-	-	-	3.40	4.71
Canary rockfish	-	-	-	-	-	-	-	-	2.31	36.11
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	1.14	0.39	-	-	-	-	-	-	0.01	-
Darkblotched rockfish	-	-	-	-	-	-	-	-	-	-
Dover sole	-	-	4.93	9.55	21.20	38.14	-	-	24.41	3.19
English sole	22.06	12.93	76.42	-	-	1.37	-	-	-	-
Eulachon	-	-	0.07	0.15	-	-	-	-	0.03	-
Flathead sole	-	-	1.11	0.82	-	-	-	-	15.91	0.79
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	-	-	-	-	-	10.48	-	-	2.89	11.65
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	-	-	-	-	-	90.18	7.56	-	14.07	12.83
Longnose skate	-	-	-	0.04	-	1.10	-	-	-	-
Pacific cod	8.95	4.93	-	2.06	-	10.42	-	-	2.27	4.19
Pacific hake	-	-	-	-	2.57	-	-	-	1.65	-
Pacific halibut	13.31	8.02	-	2.84	-	6.85	58.46	-	24.77	12.38
Pacific ocean perch	-	-	-	-	-	7.13	-	-	-	-
Pacific sanddab	80.92	22.22	22.06	2.87	-	-	-	-	-	-
Petrale sole	-	-	2.44	1.34	-	0.86	3.53	-	0.44	3.52
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	-	-	-	-	-	-	-	-	-	-
Redstripe rockfish	-	-	-	-	-	2.36	-	-	-	0.38
Rex sole	2.38	4.56	15.69	22.37	0.88	4.65	-	-	5.68	11.38
Rosethorn rockfish	-	-	-	-	-	29.61	-	-	-	0.68
Rougheye rockfish	-	-	-	0.24	1.08	-	-	-	-	-
Sablefish	-	-	-	1.61	22.88	2.02	1.54	-	1.08	1.13
Sandpaper skate	-	-	-	-	-	-	-	-	1.14	-
Sharpchin rockfish	-	-	-	-	-	4.10	-	-	-	12.90
Shortraker rockfish	-	-	-	-	7.07	-	-	-	-	-
Shortspine thornyhead	-	-	-	-	5.95	-	-	-	-	-
Silvergray rockfish	-	-	-	-	-	2.48	-	-	-	-
Slender sole	-	-	0.86	3.75	-	0.54	-	-	0.67	0.22
Southern rock sole	-	1.92	-	-	-	-	-	-	-	-
Spiny dogfish	3.11	0.82	-	-	-	86.54	441.76	-	18.79	44.88
Splitnose rockfish	-	-	-	-	-	-	-	-	-	-
Spotted ratfish	21.23	33.47	12.43	20.22	2.20	12.21	-	-	9.44	4.80
Threadfin sculpin	-	-	-	0.09	-	-	-	-	-	0.16
Walleye pollock	-	0.07	-	-	-	-	-	-	-	-
Widow rockfish	-	-	0.48	-	-	-	-	-	0.76	-
Yelloweye rockfish	-	-	-	-	-	4.55	-	-	-	9.62
Yellowmouth rockfish	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	-	-	1.37	-	-	21.38	-	-	110.20	116.68
Other	0.06	0.29	1.70	0.66	5.40	1.32	0.68	-	1.33	0.41
Total	153.16	89.62	142.21	90.73	71.53	428.29	513.53	-	312.29	292.61

Appendix 3: Continued

Species	11	12	13	14	15	16	17	18	19	20
American shad	-	-	-	-	-	-	-	-	-	-
Arrowtooth flounder	-	0.54	0.53	8.90	20.92	262.36	120.00	11.95	7.36	-
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	-	-
Bigfin eelpout	-	-	-	-	-	-	-	-	-	-
Black eelpout	-	-	-	-	-	-	-	-	-	-
Bocaccio	-	-	-	-	-	-	-	-	8.11	-
Canary rockfish	-	0.80	12.94	-	-	-	-	-	-	-
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	-	-
Darkblotched rockfish	-	-	-	-	-	-	-	-	-	-
Dover sole	-	3.51	2.03	18.86	4.84	18.65	24.67	4.38	-	-
English sole	-	58.63	61.03	2.52	1.99	0.66	0.40	10.97	29.56	-
Eulachon	-	-	0.13	0.12	-	0.13	0.09	-	-	-
Flathead sole	-	28.75	50.23	5.49	-	16.99	18.34	22.49	3.70	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	-	-	-	-	0.90	-	-	4.33	8.36	-
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	-	1.10	5.03	2.55	14.03	19.98	10.09	12.92	9.05	-
Longnose skate	-	-	-	-	-	67.96	42.24	7.95	3.30	-
Pacific cod	-	-	1.81	107.58	108.71	-	-	0.93	0.86	-
Pacific hake	-	-	-	-	-	1.91	-	-	-	-
Pacific halibut	-	-	4.79	3.01	43.76	68.17	-	3.38	13.59	-
Pacific ocean perch	-	-	-	-	-	-	0.07	-	-	-
Pacific sanddab	-	27.14	23.97	1.38	0.73	-	-	-	-	-
Petrale sole	-	3.11	4.63	2.42	1.66	1.72	1.29	-	27.61	-
Quillback rockfish	-	4.59	3.59	-	-	-	-	-	-	-
Redbanded rockfish	-	-	-	-	-	-	-	5.63	4.06	-
Redstripe rockfish	-	-	-	-	-	-	0.80	17.44	-	-
Rex sole	-	11.38	9.19	7.36	-	168.97	85.08	44.31	7.35	-
Rosethorn rockfish	-	-	-	-	-	-	-	-	-	-
Rougheye rockfish	-	-	-	-	-	0.58	0.96	-	-	-
Sablefish	-	-	-	6.11	1.09	2.54	4.16	4.98	-	-
Sandpaper skate	-	-	-	-	-	-	1.18	-	-	-
Sharpchin rockfish	-	-	-	-	-	-	0.06	-	-	-
Shortraker rockfish	-	-	-	-	-	-	-	-	-	-
Shortspine thornyhead	-	-	-	-	-	-	-	-	-	-
Silvergray rockfish	-	-	0.90	-	-	-	-	-	0.56	-
Slender sole	-	-	-	0.40	-	2.15	3.22	1.53	-	-
Southern rock sole	-	-	-	-	-	-	-	-	-	-
Spiny dogfish	-	2.02	1.36	-	9.46	13.90	23.35	61.79	53.91	-
Splitnose rockfish	-	-	-	-	-	-	-	-	-	-
Spotted ratfish	-	34.02	30.77	2.81	30.62	13.25	11.64	0.37	-	-
Threadfin sculpin	-	-	-	-	-	-	0.24	0.38	-	-
Walleye pollock	-	0.44	-	8.54	-	-	-	-	-	-
Widow rockfish	-	0.55	2.26	-	-	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	-	-	-	-	-	-
Yellowmouth rockfish	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	-	-	623.61	-	-	-	-	1.14	16.57	-
Other	-	1.15	13.25	0.79	0.42	23.20	14.04	3.36	1.76	-
Total	-	177.73	852.05	178.84	239.13	683.12	361.92	220.23	195.71	-

Appendix 3: Continued

Species	21	22	23	24	25	26	27	28	29	30
American shad	-	-	-	-	-	-	-	-	-	0.45
Arrowtooth flounder	73.04	74.31	47.92	452.90	-	-	443.39	1796.85	-	12.84
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	-	-
Bigfin eelpout	0.07	-	-	-	-	-	0.17	-	-	-
Black eelpout	-	-	0.52	-	-	-	0.08	-	-	-
Bocaccio	-	-	-	2.90	-	-	-	-	-	-
Canary rockfish	-	-	-	-	-	2.73	-	-	-	-
China rockfish	-	-	-	-	-	-	-	-	-	-
Curtfin sole	-	-	-	-	-	-	-	-	-	-
Darkblotched rockfish	47.23	-	-	-	-	-	1.20	-	-	-
Dover sole	8.33	76.12	15.27	65.70	-	-	118.08	120.35	3.09	6.21
English sole	-	-	-	-	-	2.15	1.83	1.51	8.30	65.58
Eulachon	-	-	-	-	-	-	-	-	-	-
Flathead sole	-	-	-	-	-	-	-	-	-	0.51
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	-	-	-	5.30	-	3.19	-	-	-	13.47
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	0.75	-	-	-	-
Lingcod	-	2.64	-	16.70	-	16.37	4.95	15.54	-	12.45
Longnose skate	-	-	-	-	-	-	-	-	-	-
Pacific cod	-	-	-	21.90	-	-	3.15	-	-	12.12
Pacific hake	3.13	0.05	2.45	-	-	-	3.83	-	-	-
Pacific halibut	-	-	-	3.80	-	-	5.98	-	-	4.81
Pacific ocean perch	471.40	113.61	7.50	266.80	-	-	14.76	21.00	-	-
Pacific sanddab	-	-	-	-	-	-	-	-	-	2.36
Petrale sole	-	-	-	-	-	3.97	-	-	3.51	2.70
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	1.19	5.17	0.75	9.20	-	0.61	1.84	1.40	-	-
Redstripe rockfish	-	-	-	2.60	-	-	4.93	-	-	0.43
Rex sole	6.03	1.50	6.90	7.10	-	1.45	1.46	1.62	0.37	6.77
Rosethorn rockfish	0.42	0.67	-	0.60	-	-	3.10	6.27	-	-
Rougheye rockfish	59.92	0.72	53.26	-	-	-	-	-	-	-
Sablefish	141.51	57.28	62.01	32.40	-	-	85.84	346.50	-	-
Sandpaper skate	-	-	-	-	-	-	-	-	-	-
Sharpchin rockfish	-	11.71	-	5.30	-	-	1.11	1.38	-	-
Shortraker rockfish	-	-	13.52	3.60	-	-	-	-	-	-
Shortspine thornyhead	30.85	1.85	11.82	10.50	-	-	24.04	19.25	-	-
Silvergray rockfish	-	-	-	-	-	-	-	-	-	-
Slender sole	0.03	0.87	0.04	-	-	0.47	-	-	-	1.46
Southern rock sole	-	-	-	-	-	-	-	-	-	-
Spiny dogfish	-	54.14	-	19.90	-	149.83	39.73	-	50.29	361.89
Splitnose rockfish	2.61	156.38	4.49	29.30	-	-	573.16	246.39	-	-
Spotted ratfish	-	5.92	-	15.20	-	-	5.37	1.06	-	3.81
Threadfin sculpin	-	-	-	-	-	0.13	-	-	-	-
Walleye pollock	-	-	-	-	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	1.60	-	-	-
Yelloweye rockfish	-	-	-	-	-	7.04	9.50	-	-	-
Yellowmouth rockfish	-	-	-	-	-	-	3.30	-	-	-
Yellowtail rockfish	-	-	-	-	-	-	-	-	-	9.14
Other	0.20	0.24	1.62	0.30	-	1.10	-	0.48	-	0.07
Total	845.96	563.18	228.07	972.00	-	189.79	1352.40	2579.60	65.56	517.07

Appendix 3: Continued

Species	31	32	33	34	35	36	37	38	39	40
American shad	-	-	0.53	-	3.92	1.60	0.97	-	-	-
Arrowtooth flounder	2.96	-	-	0.29	4.10	0.66	3.63	0.40	-	-
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	33.71	41.82	-	-	-
Bigfin eelpout	-	-	-	-	-	-	-	-	-	-
Black eelpout	-	-	-	-	-	-	-	-	-	-
Bocaccio	-	-	-	-	-	-	-	-	-	-
Canary rockfish	-	-	-	-	-	-	-	-	-	-
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	-	-
Darkblotched rockfish	-	-	-	-	-	-	-	-	-	-
Dover sole	1.26	3.00	16.88	0.69	26.90	38.18	35.98	3.77	-	-
English sole	6.74	5.40	0.43	6.92	1.45	14.42	29.74	41.45	-	0.27
Eulachon	-	-	6.81	-	5.20	3.22	10.58	-	-	-
Flathead sole	0.76	0.40	9.27	-	0.50	0.05	0.57	-	-	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	-	4.40	0.60	-	-	-	-	-	-	-
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	67.33	19.30	-	13.62	14.39	-	13.39	9.68	-	-
Longnose skate	-	4.00	-	2.44	28.72	8.36	37.09	-	-	-
Pacific cod	5.87	4.50	0.90	-	40.30	4.88	127.03	83.14	-	1.20
Pacific hake	-	-	0.38	-	-	-	-	-	-	-
Pacific halibut	209.12	-	-	35.69	9.55	-	27.90	4.01	0.50	16.23
Pacific ocean perch	-	-	-	-	-	-	-	-	-	-
Pacific sanddab	20.31	50.20	3.10	167.28	-	-	-	116.93	1.85	1.25
Petrale sole	20.40	1.30	-	1.90	-	1.44	1.41	7.67	-	-
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	-	-	-	-	-	-	-	-	-	-
Redstripe rockfish	68.35	52.30	-	-	-	-	-	-	-	-
Rex sole	4.66	0.60	35.80	1.89	48.33	38.36	53.23	20.50	-	0.47
Rosethorn rockfish	-	-	-	-	-	-	-	-	-	-
Rougheye rockfish	-	-	-	0.84	-	-	-	-	-	-
Sablefish	-	-	-	-	-	-	-	-	-	-
Sandpaper skate	-	-	-	-	-	-	1.24	-	-	-
Sharpchin rockfish	-	-	-	-	-	-	-	-	-	-
Shortraker rockfish	-	-	-	-	-	-	-	-	-	-
Shortspine thornyhead	-	-	-	-	-	-	-	-	-	-
Silvergray rockfish	-	-	-	-	-	-	-	-	-	-
Slender sole	0.22	-	0.80	-	-	-	-	0.16	-	-
Southern rock sole	-	12.50	0.48	0.23	-	-	-	-	1.26	5.60
Spiny dogfish	74.52	3.70	-	30.03	1.47	-	44.38	-	-	-
Splitnose rockfish	-	-	-	-	-	-	-	-	-	-
Spotted ratfish	3.74	10.70	7.23	3.83	195.71	209.23	143.85	11.30	9.56	25.88
Threadfin sculpin	-	-	-	-	-	-	-	-	-	-
Walleye pollock	-	-	-	-	-	-	9.34	0.22	-	-
Widow rockfish	-	-	-	-	-	-	0.61	-	-	-
Yelloweye rockfish	-	-	-	-	-	-	-	-	-	-
Yellowmouth rockfish	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	1.58	-	-	-	4.27	-	3.68	-	-	-
Other	-	2.80	7.51	-	2.54	5.70	4.89	4.16	0.41	0.56
Total	487.82	175.10	90.72	265.65	387.35	359.81	591.33	303.39	13.68	51.46

Appendix 3: Continued

Species	41	42	43	44	45	46	47	48	49	50
American shad	-	-	-	-	-	-	-	-	-	-
Arrowtooth flounder	-	-	-	0.24	-	-	518.17	-	533.94	-
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	-	-
Bigfin eelpout	-	-	-	-	-	-	-	-	-	-
Black eelpout	-	-	-	-	-	-	-	-	-	-
Bocaccio	-	-	-	-	-	-	2.02	-	8.80	-
Canary rockfish	-	-	-	-	-	5.20	-	-	5.90	-
China rockfish	-	-	-	-	-	6.22	-	-	-	-
Curlfin sole	-	-	1.50	0.71	0.43	-	-	-	-	-
Darkblotched rockfish	-	-	-	-	-	-	-	-	-	-
Dover sole	-	-	0.49	1.04	-	-	52.08	4.70	21.83	0.41
English sole	-	-	22.07	4.00	0.64	-	-	-	0.53	7.73
Eulachon	-	-	3.47	-	-	-	-	-	-	-
Flathead sole	1.59	-	-	-	-	-	-	-	-	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	-	-	-	-	-	-	21.95	-	5.91	-
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	0.19	-	-	-	2.19	-	-	-	-
Lingcod	-	-	1.22	-	0.20	-	2.53	-	25.25	38.11
Longnose skate	-	-	-	-	1.79	-	15.26	-	22.39	-
Pacific cod	0.28	1.35	3.86	89.26	-	0.90	1.35	-	3.48	-
Pacific hake	-	-	-	-	-	-	-	-	-	-
Pacific halibut	16.32	-	-	26.50	34.42	12.04	-	-	-	5.77
Pacific ocean perch	-	-	-	-	-	-	-	-	23.68	-
Pacific sanddab	0.97	0.90	10.02	33.87	9.40	-	-	-	-	6.51
Petrale sole	-	-	-	-	-	-	0.63	-	-	0.64
Quillback rockfish	5.88	4.41	0.94	-	-	19.08	-	-	-	-
Redbanded rockfish	-	-	-	-	-	-	-	-	23.73	-
Redstripe rockfish	-	-	-	-	-	4.54	-	-	-	-
Rex sole	-	-	8.78	1.11	0.12	-	3.02	-	8.37	2.88
Rosethorn rockfish	-	-	-	-	-	-	-	-	17.03	-
Rougheye rockfish	-	-	-	-	-	-	-	6.03	3.51	-
Sablefish	-	-	-	-	-	-	412.19	8.97	11.15	-
Sandpaper skate	-	-	-	-	-	-	-	-	-	-
Sharpchin rockfish	-	-	-	-	-	-	-	-	1202.99	-
Shortraker rockfish	-	-	-	-	-	-	-	6.30	10.98	-
Shortspine thornyhead	-	-	-	-	-	-	-	1.81	0.95	-
Silvergray rockfish	-	-	-	-	-	1.35	-	-	13.57	-
Slender sole	-	-	-	-	-	-	-	-	0.68	-
Southern rock sole	-	1.47	1.51	1.13	4.76	1.22	-	-	-	-
Spiny dogfish	-	-	-	-	-	-	50.40	-	55.42	641.06
Splitnose rockfish	-	-	-	-	-	-	-	-	1.87	-
Spotted ratfish	39.99	40.62	34.89	65.81	12.65	11.25	13.77	-	-	0.19
Threadfin sculpin	-	-	-	-	-	-	-	-	0.17	-
Walleye pollock	-	-	3.83	5.92	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	-	4.29	-	-	3.16	-
Yellowmouth rockfish	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	-	-	-	-	-	28.29	3.73	-	1.67	-
Other	0.91	0.01	1.09	0.47	-	2.97	0.64	0.72	2.70	-
Total	65.94	48.95	93.67	230.06	64.41	99.54	1097.74	28.53	2009.66	703.30

Appendix 3: Continued

Species	51	52	53	54	55	56	57	58	59	60
American shad	-	-	-	-	-	-	-	-	0.35	-
Arrowtooth flounder	0.27	0.15	-	0.41	0.16	-	-	3.00	-	6.86
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	20.21	23.70	-	2.37	-	-	-	1.25	-
Bigfin eelpout	-	-	-	-	-	-	-	-	-	-
Black eelpout	-	-	-	-	-	-	-	-	-	-
Bocaccio	-	-	-	-	-	-	-	-	-	-
Canary rockfish	-	-	-	-	-	-	-	-	-	-
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	0.17	1.15	-	-	-	-
Darkblotched rockfish	-	-	-	-	-	-	-	0.24	1.54	0.53
Dover sole	0.27	-	-	0.97	-	-	-	6.72	2.24	12.34
English sole	7.70	1.26	1.61	8.01	2.31	7.35	20.00	-	0.49	-
Eulachon	-	-	-	-	-	-	-	0.34	-	1.16
Flathead sole	-	-	-	0.23	-	-	-	7.01	2.13	0.47
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	-	-	-	-	-	-	-	-	0.33	2.60
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	30.58	55.56	52.97	51.57	-	-	150.00	45.83	35.45	36.30
Longnose skate	-	8.34	-	-	-	-	-	32.21	-	6.53
Pacific cod	0.52	-	-	-	-	-	-	0.68	-	1.98
Pacific hake	-	-	-	-	-	-	-	3.76	5.15	0.10
Pacific halibut	13.46	36.11	59.59	18.30	7.40	-	100.00	16.05	36.08	3.77
Pacific ocean perch	-	-	-	-	-	-	-	-	-	-
Pacific sanddab	1.38	4.14	7.75	2.50	6.68	6.33	20.00	-	-	-
Petrale sole	3.33	2.32	1.17	5.20	0.31	-	-	4.28	8.22	5.35
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	-	-	-	-	-	-	-	-	-	-
Redstripe rockfish	-	-	-	-	-	-	-	-	-	-
Rex sole	10.32	5.96	-	6.84	-	2.07	20.00	21.09	4.34	8.25
Rosethorn rockfish	-	-	-	-	-	-	-	-	-	-
Rougheye rockfish	-	-	-	-	-	-	-	-	-	-
Sablefish	-	-	-	-	-	-	-	0.39	-	-
Sandpaper skate	-	-	-	-	-	-	-	-	-	-
Sharpchin rockfish	-	-	-	-	-	-	-	0.17	-	-
Shortraker rockfish	-	-	-	-	-	-	-	-	-	-
Shortspine thornyhead	-	-	-	-	-	-	-	-	-	-
Silvergray rockfish	-	-	-	-	-	-	-	-	-	-
Slender sole	1.10	-	-	0.45	-	-	-	3.20	0.29	1.78
Southern rock sole	-	-	4.98	-	4.12	3.47	-	-	-	-
Spiny dogfish	96.13	663.46	758.63	183.28	4.28	-	11053.00	131.90	376.98	82.28
Splitnose rockfish	-	-	-	-	-	-	-	-	-	-
Spotted ratfish	-	-	-	-	3.79	3.56	-	-	-	1.60
Threadfin sculpin	-	-	-	-	-	-	-	-	-	-
Walleye pollock	-	-	-	-	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	-	-	-	-	-	-
Yellowmouth rockfish	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	-	-	-	-	-	-	-	-	-	-
Other	5.14	-	-	2.01	-	0.21	-	3.51	1.26	2.08
Total	170.20	797.51	910.40	279.77	31.59	24.24	11363.00	280.38	476.10	173.98

Appendix 3: Continued

Species	61	62	63	64	65	66	67	68	69	70
American shad	-	-	0.27	-	-	1.18	-	-	-	-
Arrowtooth flounder	4.51	171.74	119.15	0.30	-	6.39	85.36	93.07	20.62	24.40
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	-	-
Bigfin eelpout	-	-	-	-	-	-	-	-	2.95	-
Black eelpout	-	-	-	-	-	-	-	-	0.77	-
Bocaccio	-	-	3.62	-	-	-	-	-	-	-
Canary rockfish	-	-	-	-	-	-	2.76	-	-	2.43
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	-	-
Darkblotched rockfish	-	-	0.20	-	-	-	0.98	3.00	-	-
Dover sole	2.14	41.71	112.62	1.57	28.64	2.80	99.89	55.21	57.19	14.40
English sole	-	0.47	-	14.29	28.46	1.20	1.15	-	-	0.88
Eulachon	1.80	-	0.49	-	-	-	-	-	-	-
Flathead sole	-	-	0.97	-	-	-	0.01	-	-	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	-	3.10	4.61	-	-	-	7.04	-	-	3.70
Grenadiers	-	-	-	-	-	-	-	15.26	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	15.03	-	0.59	5.03	47.38	5.05	3.62	-	-	-
Longnose skate	3.11	-	21.69	3.23	-	3.26	15.04	15.39	6.82	5.32
Pacific cod	4.24	104.53	0.78	-	0.26	-	17.37	-	-	-
Pacific hake	-	-	-	-	-	0.84	-	14.55	13.45	-
Pacific halibut	-	-	-	21.38	26.85	12.52	-	-	-	-
Pacific ocean perch	-	-	0.05	-	-	-	9.80	3.57	0.68	788.35
Pacific sanddab	-	-	-	27.86	74.59	-	-	-	-	-
Petrale sole	5.09	-	2.61	3.00	5.80	4.66	2.13	-	0.68	-
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	2.71	3.38	-	-	-	-	-	-	-	1.09
Redstripe rockfish	-	-	-	-	-	-	-	-	-	-
Rex sole	1.78	21.49	35.42	31.00	37.66	12.30	41.16	5.09	10.27	2.55
Rosethorn rockfish	-	-	-	-	-	-	-	0.53	-	-
Rougheye rockfish	-	-	-	-	-	-	-	17.04	84.48	8.22
Sablefish	0.87	2.85	3.07	-	-	-	10.20	257.47	163.98	5.34
Sandpaper skate	-	-	0.98	0.88	-	-	-	1.84	1.69	-
Sharpchin rockfish	-	-	-	-	-	-	-	-	-	1.33
Shortraker rockfish	-	-	-	-	-	-	-	95.12	8.73	-
Shortspine thornyhead	-	-	-	-	-	-	-	-	27.42	0.24
Silvergray rockfish	-	-	-	-	-	-	-	-	-	1.19
Slender sole	0.83	1.07	8.97	0.24	-	1.81	1.95	-	-	-
Southern rock sole	-	-	-	-	0.27	-	-	-	-	-
Spiny dogfish	117.07	233.83	50.08	16.41	36.65	193.00	181.51	-	-	13.01
Splitnose rockfish	-	-	-	-	-	-	-	12.17	-	-
Spotted ratfish	6.80	7.80	4.43	-	-	-	2.16	0.83	2.61	6.84
Threadfin sculpin	-	-	-	-	-	0.08	-	-	-	0.70
Walleye pollock	-	-	-	-	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	-	-	-	-	-	-
Yellowmouth rockfish	-	-	-	-	-	-	-	-	-	0.55
Yellowtail rockfish	-	2.64	-	-	-	-	2.82	-	-	7.01
Other	0.62	4.11	2.31	0.52	-	2.64	8.22	10.33	6.33	0.15
Total	166.60	598.72	372.91	125.71	286.56	247.73	493.17	600.47	408.67	887.70

Appendix 3: Continued

Species	71	72	73	74	75	76	77	78	79	80
American shad	-	-	-	-	-	-	-	-	-	1.30
Arrowtooth flounder	170.84	111.54	155.27	669.15	109.70	127.11	7.54	-	-	1.28
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	57.34	10.72
Bigfin eelpout	-	-	-	-	-	-	-	-	-	-
Black eelpout	-	-	-	-	-	-	-	-	-	-
Bocaccio	-	-	-	3.52	3.88	-	-	-	-	-
Canary rockfish	5.59	-	-	-	-	-	-	-	12.88	-
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	-	-
Darkblotched rockfish	28.95	11.79	21.80	-	22.80	-	0.10	-	-	-
Dover sole	29.51	214.97	134.04	11.80	38.43	14.05	1.44	-	-	3.98
English sole	0.72	0.87	0.60	-	0.40	5.21	-	41.68	1.73	-
Eulachon	-	-	-	-	-	-	-	-	-	-
Flathead sole	-	4.26	3.48	-	0.48	-	3.12	-	-	3.96
Green sturgeon	-	-	-	-	-	-	-	-	63.50	-
Greenstriped rockfish	1.45	2.41	18.30	-	85.55	20.72	-	-	-	0.30
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	0.23	-
Lingcod	-	-	-	-	11.58	42.94	8.63	102.77	13.37	10.99
Longnose skate	13.16	20.58	19.02	-	-	-	19.85	4.89	-	16.27
Pacific cod	2.08	12.36	5.24	-	4.30	22.97	1.69	-	-	-
Pacific hake	-	0.17	-	-	-	-	5.45	-	-	0.77
Pacific halibut	-	-	-	-	-	-	33.51	73.56	17.64	4.05
Pacific ocean perch	231.41	19.00	17.16	643.29	-	-	-	-	-	-
Pacific sanddab	-	-	-	-	-	-	0.30	11.53	3.93	-
Petrale sole	-	2.49	3.26	-	-	10.59	1.01	5.03	-	1.68
Quillback rockfish	-	-	-	-	-	-	-	-	5.54	-
Redbanded rockfish	-	1.65	-	2.36	-	-	-	-	-	-
Redstripe rockfish	-	0.45	-	5.53	0.34	0.35	-	-	-	-
Rex sole	7.01	63.20	133.78	2.44	12.71	9.62	5.51	4.10	-	17.50
Rosethorn rockfish	-	-	0.49	5.64	-	2.70	-	-	-	-
Rougheye rockfish	-	-	-	-	-	-	-	-	-	-
Sablefish	121.77	7.66	9.13	10.00	11.27	38.48	-	-	-	-
Sandpaper skate	-	-	-	-	-	-	-	1.02	-	-
Sharpchin rockfish	10.42	-	1.00	360.65	-	0.35	-	-	-	-
Shortraker rockfish	-	-	-	-	-	-	-	-	-	-
Shortspine thornyhead	1.02	-	-	4.60	-	-	-	-	-	-
Silvergray rockfish	2.93	-	-	-	-	-	-	-	-	-
Slender sole	0.93	3.62	2.15	-	0.80	0.49	0.34	-	-	0.98
Southern rock sole	-	-	-	-	-	-	-	-	11.22	-
Spiny dogfish	17.01	59.40	22.62	38.50	63.92	143.76	9.20	82.25	1.39	70.77
Splitnose rockfish	218.60	-	-	0.77	-	-	-	-	-	-
Spotted ratfish	0.38	11.00	4.65	16.95	11.70	2.82	-	-	0.33	0.79
Threadfin sculpin	-	-	-	-	0.16	-	-	-	-	-
Walleye pollock	-	-	-	-	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	-	-	-	-	-	-
Yellowmouth rockfish	-	-	-	-	-	5.19	-	-	-	-
Yellowtail rockfish	-	-	-	37.11	-	-	-	-	-	-
Other	0.40	26.30	11.23	2.62	2.02	1.44	4.10	1.02	8.40	3.61
Total	664.18	579.32	572.40	1850.66	389.27	448.79	102.79	327.85	197.73	148.95

Appendix 3: Continued

Species	81	82	83	84	85	86	87	88	89	90
American shad	-	-	-	-	-	-	-	-	-	0.48
Arrowtooth flounder	2.01	220.91	64.04	45.60	94.34	377.84	-	124.81	-	3.89
Bank rockfish	-	-	-	-	15.12	-	-	-	-	-
Big skate	21.30	-	-	-	-	-	-	-	-	-
Bigfin eelpout	-	-	6.51	-	-	-	-	-	-	-
Black eelpout	-	-	4.25	-	-	-	-	-	-	-
Bocaccio	448.75	-	-	-	-	-	-	-	-	-
Canary rockfish	1640.72	-	-	-	-	10.20	-	5.38	-	-
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	-	-
Darkblotched rockfish	-	3.42	1.26	40.26	20.41	-	-	-	-	-
Dover sole	0.46	74.00	158.98	16.22	24.81	32.35	0.17	16.51	-	1.57
English sole	-	7.72	-	-	-	2.46	1.52	-	6.39	0.18
Eulachon	-	-	-	-	-	-	-	-	-	-
Flathead sole	-	-	-	-	-	-	-	-	-	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	4.84	2.60	-	-	0.75	12.88	0.52	8.59	-	57.25
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	21.66	-	-	-	22.24	19.38	19.63	14.99	2.29	2.30
Longnose skate	-	-	34.14	10.91	-	32.80	-	12.77	-	-
Pacific cod	266.25	-	-	-	-	6.07	-	7.60	-	-
Pacific hake	-	-	21.91	11.66	-	-	-	-	-	-
Pacific halibut	25.60	-	-	14.24	15.06	29.88	2.82	7.50	-	-
Pacific ocean perch	0.21	59.94	11.50	305.01	613.75	279.95	6.23	553.43	-	-
Pacific sanddab	-	-	-	-	-	-	-	-	-	-
Petrale sole	1.57	-	-	-	-	-	-	3.13	0.31	-
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	-	8.12	16.58	7.66	50.36	1.68	-	26.57	-	-
Redstripe rockfish	0.22	-	-	-	-	1.69	-	1.66	-	9.75
Rex sole	3.73	19.68	18.75	-	17.57	19.96	-	18.95	0.21	19.25
Rosethorn rockfish	-	2.51	-	0.83	0.89	0.30	-	6.14	-	0.62
Rougheye rockfish	-	-	346.44	1.81	-	-	-	-	-	-
Sablefish	-	15.66	88.57	158.26	8.06	22.82	-	11.58	-	-
Sandpaper skate	-	-	5.40	-	-	-	-	-	-	-
Sharpchin rockfish	0.52	154.80	2.38	9.20	63.97	105.93	0.70	440.42	-	1.38
Shortraker rockfish	-	-	-	-	-	-	-	-	-	-
Shortspine thornyhead	-	9.42	64.23	6.69	1.19	-	-	0.06	-	-
Silvergray rockfish	37.95	6.63	-	-	36.60	39.86	-	24.85	8.77	17.64
Slender sole	0.11	2.42	-	-	-	-	0.01	-	0.01	0.11
Southern rock sole	-	-	-	-	-	-	-	-	-	-
Spiny dogfish	132.67	23.39	4.11	26.53	24.09	52.06	658.06	33.59	586.68	701.42
Splitnose rockfish	-	305.47	-	228.20	65.78	0.40	-	-	-	-
Spotted ratfish	8.75	10.37	9.81	3.19	7.07	5.12	0.92	5.29	-	5.43
Threadfin sculpin	-	2.61	-	-	-	-	-	0.22	-	-
Walleye pollock	-	-	-	-	-	-	-	-	-	-
Widow rockfish	1.55	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	-	-	-	-	-	23.09
Yellowmouth rockfish	-	-	-	-	107.96	-	-	97.69	-	-
Yellowtail rockfish	72.59	-	-	-	1.32	4.80	-	12.66	-	-
Other	1.21	4.93	10.57	0.41	0.02	1.73	-	0.72	0.09	1.52
Total	2692.68	934.60	869.43	886.68	1191.36	1060.16	690.58	1435.11	604.75	846.08

Appendix 3: Continued

Species	91	92	93	94	95	96	97	98	99	100
American shad	-	-	-	-	-	-	-	-	-	-
Arrowtooth flounder	2.87	0.88	0.21	0.50	1.01	-	0.71	375.02	-	0.10
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	2.21	6.05	-	-	-	-	-	-	-
Bigfin eelpout	-	-	-	-	-	-	-	-	-	-
Black eelpout	-	-	-	-	-	-	-	-	-	-
Bocaccio	-	-	-	-	7.80	-	-	2.51	-	-
Canary rockfish	-	-	-	-	-	-	-	53.78	231.25	15.20
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	-	-
Darkblotched rockfish	-	-	-	-	-	-	-	0.10	-	-
Dover sole	0.70	5.42	0.60	0.12	-	0.91	-	14.73	-	-
English sole	-	54.67	28.53	-	10.58	37.30	6.50	15.79	7.03	-
Eulachon	-	-	-	-	-	-	-	-	-	-
Flathead sole	-	-	-	0.33	0.88	-	-	-	-	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	0.73	-	-	-	-	-	-	174.30	1.20	13.10
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	-	58.51	14.13	15.84	36.38	35.27	8.85	34.06	7.40	59.70
Longnose skate	-	4.85	14.15	-	-	4.63	-	10.54	6.30	-
Pacific cod	-	0.45	-	-	2.87	-	-	131.26	0.50	-
Pacific hake	-	-	-	-	0.03	-	-	-	-	-
Pacific halibut	-	6.99	-	-	4.16	6.68	4.86	15.50	15.00	6.40
Pacific ocean perch	-	-	-	-	-	-	-	6.07	-	-
Pacific sanddab	-	18.18	27.18	0.24	7.48	18.89	-	-	-	-
Petrale sole	-	6.20	2.12	1.81	1.45	3.44	1.75	11.37	8.00	2.90
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	-	-	-	-	-	-	-	-	-	-
Redstripe rockfish	-	-	-	-	-	-	-	-	-	-
Rex sole	16.36	48.11	43.71	11.48	9.16	34.55	4.61	25.60	0.40	7.90
Rosethorn rockfish	-	-	-	-	-	-	-	-	-	-
Rougheye rockfish	-	-	-	-	-	-	-	-	-	-
Sablefish	-	-	-	-	-	-	-	-	-	-
Sandpaper skate	-	1.11	-	-	-	-	-	132.61	-	-
Sharpchin rockfish	-	-	-	-	-	-	-	-	-	-
Shortraker rockfish	-	-	-	-	-	-	-	0.24	-	-
Shortspine thornyhead	-	-	-	-	-	-	-	-	-	-
Silvergray rockfish	1.85	-	-	-	-	-	-	-	-	-
Slender sole	1.56	0.22	0.30	1.06	0.84	-	0.17	71.54	-	-
Southern rock sole	-	-	-	-	-	1.88	-	1.19	0.08	0.30
Spiny dogfish	23.26	13.03	20.88	14.15	37.45	5.58	47.49	1273.68	111.80	83.60
Splitnose rockfish	-	-	-	-	-	-	-	-	-	-
Spotted ratfish	-	-	1.28	0.62	-	-	-	12.68	0.02	-
Threadfin sculpin	0.28	-	-	-	-	-	-	-	-	-
Walleye pollock	-	-	-	-	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	-	-	-	-	-	5.80
Yellowmouth rockfish	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	-	-	-	-	-	-	-	-	-	-
Other	1.93	8.98	1.03	3.95	1.10	0.01	2.64	2.25	5.00	2.00
Total	49.54	230.01	160.17	50.10	121.19	149.14	77.58	2364.82	394.98	197.00

Appendix 3: Continued

Species	101	102	103	104	105	106	107	108	109	110
American shad	-	-	0.42	-	-	-	-	0.17	-	-
Arrowtooth flounder	30.60	198.20	1.03	339.15	177.03	756.89	-	6.65	-	-
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	-	-
Bigfin eelpout	-	1.75	-	1.37	0.80	3.62	-	-	-	-
Black eelpout	-	-	0.07	-	0.41	0.03	-	-	-	-
Bocaccio	-	5.00	-	-	-	4.16	3.00	3.42	-	-
Canary rockfish	343.50	5.20	-	-	-	-	715.17	6.39	-	-
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	-	-
Darkblotched rockfish	-	8.20	-	24.30	2.41	1.25	-	-	-	-
Dover sole	15.00	209.70	-	167.84	153.51	167.85	18.50	-	-	-
English sole	0.60	-	36.85	0.73	-	-	29.88	2.06	2.50	-
Eulachon	-	-	-	-	-	-	-	0.53	-	-
Flathead sole	-	-	-	-	-	-	-	-	-	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	72.40	-	-	-	-	-	3.19	-	-	-
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	5.40	-	20.04	-	-	-	37.77	193.40	13.53	-
Longnose skate	12.10	4.40	-	19.51	23.13	2.85	-	3.24	6.15	-
Pacific cod	118.80	-	-	-	-	-	6.61	-	-	-
Pacific hake	-	6.20	-	4.09	1.74	1.01	-	-	-	-
Pacific halibut	-	-	8.28	2.53	-	-	30.09	3.39	7.58	-
Pacific ocean perch	0.70	159.40	-	21.52	12.32	252.60	-	-	-	-
Pacific sanddab	-	-	4.30	-	-	-	-	-	-	-
Petrale sole	-	-	2.70	-	-	-	34.59	10.11	-	-
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	-	8.90	-	1.44	3.05	10.50	-	-	-	-
Redstripe rockfish	506.20	2.90	-	-	-	-	-	-	-	-
Rex sole	57.70	52.30	7.92	11.41	5.95	-	5.31	8.39	4.58	-
Rosethorn rockfish	1.00	0.40	-	-	-	-	-	-	-	-
Rougheye rockfish	-	1.90	-	123.97	82.93	8.45	-	-	-	-
Sablefish	4.30	81.70	-	176.88	163.74	281.45	43.46	-	-	-
Sandpaper skate	-	-	-	2.23	-	-	-	-	-	-
Sharpchin rockfish	26.90	-	-	-	-	-	-	-	-	-
Shortraker rockfish	-	-	-	21.52	5.37	-	-	-	-	-
Shortspine thornyhead	-	68.80	-	7.61	14.08	25.00	-	-	-	-
Silvergray rockfish	87.20	2.80	-	-	-	-	30.06	-	-	-
Slender sole	-	-	0.23	-	-	-	2.60	1.15	-	-
Southern rock sole	-	-	-	-	-	-	-	-	-	-
Spiny dogfish	89.40	9.10	39.31	5.43	8.03	37.25	1053.58	218.74	57.53	-
Splitnose rockfish	-	145.30	-	-	-	403.17	-	-	-	-
Spotted ratfish	1.60	4.30	0.34	11.08	1.23	18.54	4.71	1.66	-	-
Threadfin sculpin	-	-	0.23	-	-	-	-	-	-	-
Walleye pollock	-	-	-	-	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	12.70	-	-	-	-	-	-	-	-	-
Yellowmouth rockfish	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	17.80	-	-	-	23.98	-	11.10	-	-	-
Other	11.50	1.20	1.34	-	7.84	0.48	0.07	-	1.69	-
Total	1415.40	977.55	123.06	942.61	687.55	1975.10	2029.69	459.30	93.56	-

Appendix 3: Continued

Species	111	112	113	114	115	116	117	118	119	120
American shad	-	-	-	-	0.65	-	-	-	-	-
Arrowtooth flounder	199.23	25.42	0.37	4.67	5.46	-	91.08	250.22	185.51	-
Bank rockfish	1.16	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	-	-
Bigfin eelpout	-	-	-	-	-	-	-	0.91	-	-
Black eelpout	-	-	-	-	-	-	-	-	-	-
Bocaccio	-	29.61	7.49	-	-	-	-	-	4.02	-
Canary rockfish	-	54.65	5.53	-	-	-	4.89	-	4.27	-
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	-	-
Darkblotched rockfish	12.80	-	-	-	-	-	-	18.05	1.46	-
Dover sole	52.53	-	5.53	15.15	8.77	-	31.87	235.44	8.56	-
English sole	-	-	15.50	21.44	19.70	-	102.63	-	-	-
Eulachon	-	-	-	-	-	-	-	-	-	-
Flathead sole	-	-	-	-	0.18	-	-	-	-	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	-	2.64	0.13	-	-	-	0.30	-	12.58	-
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	4.51	-	-	-	-	-
Lingcod	34.99	241.85	4.61	17.55	18.89	12.01	20.22	-	7.52	-
Longnose skate	14.68	-	7.24	-	-	-	-	0.47	12.60	-
Pacific cod	5.06	-	24.77	0.76	4.15	-	40.06	-	26.19	-
Pacific hake	-	-	-	-	-	-	-	13.72	-	-
Pacific halibut	-	221.35	4.01	4.08	-	-	-	-	-	-
Pacific ocean perch	1.84	-	-	-	-	-	-	31.62	661.21	-
Pacific sanddab	1.48	-	-	-	-	0.73	-	-	-	-
Petrale sole	-	2.25	2.06	10.81	2.39	-	8.17	-	0.75	-
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	12.81	-	-	-	-	-	-	10.50	4.88	-
Redstripe rockfish	-	-	-	-	-	-	-	-	0.34	-
Rex sole	3.14	-	5.73	15.08	19.06	0.25	65.76	5.92	13.09	-
Rosethorn rockfish	7.05	0.66	-	-	-	-	-	-	0.42	-
Rougheye rockfish	1.17	-	-	-	-	-	-	334.53	-	-
Sablefish	10.55	42.54	-	-	0.77	-	13.77	94.19	13.34	-
Sandpaper skate	-	-	-	-	-	-	-	-	-	-
Sharpchin rockfish	42.41	116.84	0.07	-	-	-	-	-	45.10	-
Shortraker rockfish	8.88	9.86	-	-	-	-	-	-	-	-
Shortspine thornyhead	99.71	-	-	-	-	-	-	24.69	5.57	-
Silvergray rockfish	-	136.23	18.00	4.18	-	-	81.96	-	3.25	-
Slender sole	-	-	-	2.42	0.36	-	1.18	-	-	-
Southern rock sole	-	-	-	-	-	7.79	-	-	-	-
Spiny dogfish	5.90	214.69	73.05	548.36	161.16	2.79	43.15	38.58	200.65	-
Splitnose rockfish	908.28	-	-	-	-	-	-	3.66	0.27	-
Spotted ratfish	3.06	12.45	0.66	7.27	5.03	31.90	7.07	-	5.21	-
Threadfin sculpin	-	-	-	-	-	-	-	-	-	-
Walleye pollock	-	-	0.24	-	0.34	-	-	1.80	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	-	-	-	-	-	-
Yellowmouth rockfish	-	-	-	-	-	-	-	-	88.27	-
Yellowtail rockfish	-	1.61	1.19	-	-	-	2.76	-	-	-
Other	112.88	0.40	0.45	2.27	5.35	-	0.51	4.12	1.56	-
Total	1539.61	1113.05	176.63	654.04	256.77	55.47	515.38	1068.42	1306.62	-

Appendix 3: Continued

Species	121	122	123	124	125	126	127	128	129	130
American shad	-	-	-	-	-	-	-	-	-	-
Arrowtooth flounder	199.68	47.33	-	14.46	9.55	-	14.22	418.50	-	31.25
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	-	-
Bigfin eelpout	-	-	-	-	-	-	-	-	-	-
Black eelpout	-	-	-	-	-	-	-	-	-	-
Bocaccio	-	3.30	-	-	-	-	-	-	-	-
Canary rockfish	-	7.81	-	2.33	-	-	3.34	-	-	-
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	0.49	-
Darkblotched rockfish	52.82	-	-	-	-	-	-	11.36	-	-
Dover sole	164.09	4.12	-	5.54	2.37	-	1.44	1.26	-	17.28
English sole	-	-	-	1.94	97.40	0.60	3.89	-	-	6.62
Eulachon	-	-	-	-	-	-	-	-	-	-
Flathead sole	-	-	-	-	-	-	-	-	-	4.58
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	0.44	2.49	-	1.30	2.73	-	-	-	-	62.47
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	-	10.26	-	17.79	11.86	2.86	0.51	5.54	7.58	52.23
Longnose skate	12.34	-	-	-	-	-	-	-	-	19.69
Pacific cod	1.16	2.35	-	12.50	0.84	-	31.34	-	-	4.74
Pacific hake	10.57	-	-	1.84	-	-	-	-	-	-
Pacific halibut	8.12	5.64	-	-	4.32	23.84	3.05	-	14.89	4.46
Pacific ocean perch	194.48	63.93	-	1.36	-	-	-	363.42	-	12.21
Pacific sanddab	-	-	-	-	8.26	0.60	-	-	0.86	-
Petrale sole	-	-	-	2.30	1.26	-	-	-	1.21	11.94
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	7.92	3.46	-	9.54	0.80	-	-	5.42	-	-
Redstripe rockfish	1.91	9.90	-	15.41	2.39	-	-	-	-	-
Rex sole	20.70	3.44	-	53.50	17.71	-	17.90	-	0.21	49.53
Rosethorn rockfish	-	0.53	-	0.24	-	-	-	1.47	-	-
Rougheye rockfish	12.41	-	-	-	-	-	-	1.53	-	-
Sablefish	65.47	2.21	-	4.44	-	-	-	-	-	1.11
Sandpaper skate	-	-	-	-	-	-	-	-	-	-
Sharpchin rockfish	0.91	26.55	-	-	-	-	-	0.88	-	12.66
Shortraker rockfish	-	-	-	-	-	-	-	-	-	-
Shortspine thornyhead	39.72	20.29	-	1.13	-	-	-	15.18	-	-
Silvergray rockfish	-	34.68	-	3.49	2.24	-	-	-	-	137.95
Slender sole	-	-	-	2.96	-	-	0.16	-	-	2.88
Southern rock sole	-	-	-	-	-	2.42	0.32	-	0.43	-
Spiny dogfish	28.27	19.11	-	43.12	48.02	4.85	13.02	2.99	-	384.48
Splitnose rockfish	373.61	0.93	-	0.87	-	-	-	29.88	-	-
Spotted ratfish	10.92	5.11	-	-	2.49	35.65	5.71	-	10.81	1.56
Threadfin sculpin	-	-	-	-	-	-	-	-	-	-
Walleye pollock	-	-	-	1.28	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	0.56
Yelloweye rockfish	-	-	-	-	-	-	-	-	-	-
Yellowmouth rockfish	-	60.27	-	-	-	-	-	-	-	-
Yellowtail rockfish	-	-	-	0.61	-	-	-	-	-	-
Other	-	1.50	-	2.72	0.03	0.21	-	0.66	-	10.29
Total	1205.54	335.21	-	200.67	212.27	71.03	94.90	858.09	36.48	828.49

Appendix 3: Continued

Species	131	132	133	134	135	136	137	138	139	140
American shad	-	-	-	-	-	-	-	-	-	0.35
Arrowtooth flounder	25.05	-	22.70	1332.96	469.88	4.85	1184.48	85.85	-	1.44
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	-	-
Bigfin eelpout	-	-	-	-	-	-	-	-	-	-
Black eelpout	-	-	-	-	-	-	-	-	-	-
Bocaccio	8.66	-	7.88	-	-	-	-	-	-	4.05
Canary rockfish	138.69	-	26.49	1.11	675.17	4.41	3.00	1.60	-	-
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	2.26	-
Darkblotched rockfish	-	-	-	-	-	-	-	2.34	-	-
Dover sole	13.12	-	96.11	6.03	1.92	7.13	31.92	33.84	-	1.21
English sole	3.49	-	10.50	-	-	9.24	41.85	-	0.48	18.17
Eulachon	-	-	-	-	-	-	-	-	-	-
Flathead sole	-	-	0.59	-	-	-	-	-	-	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	53.50	-	1.18	12.77	2.78	-	14.07	-	-	-
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	17.34	-	8.83	25.33	56.43	33.35	28.32	38.00	2.81	8.93
Longnose skate	32.06	-	14.22	-	30.59	7.03	8.28	0.37	-	10.77
Pacific cod	46.11	-	13.52	45.87	-	0.15	32.28	-	-	1.49
Pacific hake	-	-	-	-	-	-	-	0.74	-	-
Pacific halibut	-	-	-	13.29	14.95	4.91	-	-	5.84	-
Pacific ocean perch	1.06	-	1.16	-	-	-	0.21	95.65	-	-
Pacific sanddab	-	-	-	-	-	-	-	-	12.85	14.67
Petrale sole	0.67	-	1.17	-	15.79	7.21	15.40	-	1.55	-
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	-	-	7.78	-	-	-	-	17.58	-	-
Redstripe rockfish	317.17	-	7.83	-	-	-	-	-	-	-
Rex sole	25.49	-	107.41	15.04	2.45	5.81	8.13	1.13	-	62.50
Rosethorn rockfish	-	-	-	0.30	0.57	-	-	0.02	-	-
Rougheye rockfish	-	-	-	-	-	-	-	-	-	-
Sablefish	5.20	-	-	-	9.61	-	11.82	43.09	-	-
Sandpaper skate	-	-	1.07	0.30	-	-	-	1.77	-	-
Sharpchin rockfish	23.71	-	0.17	-	-	-	0.48	0.21	-	-
Shortraker rockfish	-	-	-	-	-	-	-	-	-	-
Shortspine thornyhead	-	-	-	-	-	-	-	46.89	-	-
Silvergray rockfish	148.44	-	16.34	-	149.25	-	-	-	-	-
Slender sole	0.67	-	4.15	-	-	-	0.42	0.19	-	0.83
Southern rock sole	-	-	-	-	-	-	-	-	0.40	-
Spiny dogfish	37.92	-	29.57	221.00	126.24	32.95	34.77	49.91	-	199.76
Splitnose rockfish	-	-	-	-	-	-	-	162.71	-	-
Spotted ratfish	12.21	-	2.03	0.66	56.79	0.51	4.65	27.79	8.52	1.53
Threadfin sculpin	-	-	-	-	0.33	-	-	-	-	-
Walleye pollock	-	-	-	-	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	19.51	-	-	12.85	11.16	-	-	-	-	-
Yellowmouth rockfish	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	2.34	-	-	-	4578.59	-	-	-	-	-
Other	22.04	-	7.13	0.46	8.12	3.04	2.10	2.04	-	2.13
Total	954.45	-	387.83	1687.97	6210.62	120.59	1422.18	611.72	34.71	327.83

Appendix 3: Continued

Species	141	142	143	144	145	146	147	148	149	150
American shad	-	-	-	-	-	-	-	-	-	-
Arrowtooth flounder	4.29	215.33	114.63	152.07	401.88	515.56	397.22	-	368.60	873.54
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	-	-
Bigfin eelpout	-	-	1.10	2.01	-	-	-	-	-	-
Black eelpout	-	-	-	0.58	0.02	-	-	-	-	-
Bocaccio	-	18.58	-	-	-	-	-	-	-	-
Canary rockfish	-	4168.19	-	-	255.23	117.49	2.46	-	4.25	6.37
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	-	-
Darkblotched rockfish	-	-	9.30	2.70	-	-	1.88	-	-	-
Dover sole	10.35	41.31	146.86	129.84	18.80	10.40	10.28	2.68	8.88	20.36
English sole	18.30	0.52	-	-	3.29	3.65	0.37	15.54	2.63	8.22
Eulachon	-	-	-	-	-	-	0.34	-	-	-
Flathead sole	-	-	-	-	-	-	6.28	0.14	0.54	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	0.33	30.29	-	-	141.07	21.70	0.50	0.18	2.02	8.99
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	10.55	4.59	-	-	21.26	10.69	2.37	27.55	46.98	4.94
Longnose skate	-	-	2.93	56.92	6.23	14.16	11.68	11.70	9.52	-
Pacific cod	2.10	5.52	-	-	-	0.88	-	2.73	1.08	0.89
Pacific hake	-	-	6.20	1.42	-	-	-	-	-	-
Pacific halibut	9.29	-	-	7.08	-	3.64	-	-	-	4.70
Pacific ocean perch	-	-	578.03	48.00	1.87	1.06	0.10	-	-	-
Pacific sanddab	2.15	-	-	-	-	-	-	4.76	-	-
Petrale sole	0.23	-	-	-	-	2.58	2.38	0.32	-	0.74
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	-	-	9.78	2.50	-	-	-	-	1.36	-
Redstripe rockfish	-	-	-	-	3.27	5.80	-	-	-	-
Rex sole	10.94	27.75	9.75	14.88	50.97	65.70	41.43	12.17	118.75	48.53
Rosethorn rockfish	-	2.94	-	-	3.28	-	-	-	-	-
Rougheye rockfish	-	-	0.06	73.48	1.64	-	-	-	-	-
Sablefish	-	49.84	17.08	75.19	131.28	94.13	3.30	-	33.46	297.04
Sandpaper skate	-	-	-	2.26	-	-	-	-	-	-
Sharpchin rockfish	-	10.62	-	-	7.01	-	-	-	-	-
Shortraker rockfish	-	-	-	5.77	-	-	-	-	-	-
Shortspine thornyhead	-	-	4.57	16.20	-	-	-	-	-	-
Silvergray rockfish	-	78.76	-	-	15.67	4.34	-	-	38.32	20.15
Slender sole	0.12	-	-	-	-	0.62	1.12	36.00	0.55	0.80
Southern rock sole	-	-	-	-	-	-	-	-	-	-
Spiny dogfish	71.16	32.81	1.99	2.03	39.92	36.93	163.76	21.56	30.59	118.10
Splitnose rockfish	-	-	133.86	0.62	-	-	-	-	-	-
Spotted ratfish	3.24	1.46	1.21	1.01	4.60	3.33	1.21	4.07	5.13	8.17
Threadfin sculpin	-	0.68	-	-	0.12	-	0.15	-	-	-
Walleye pollock	0.22	-	-	-	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	6.80	-	-	-	-	-
Yellowmouth rockfish	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	86.99	25.42	-	-	6.05	2.27	22.55	-	-	-
Other	3.53	0.65	0.19	10.31	2.83	10.47	2.41	5.16	0.61	3.74
Total	233.79	4715.26	1037.54	604.87	1123.09	925.40	671.79	144.56	673.27	1425.28

Appendix 3: Continued

Species	151	152	153	154	155	156	157	158	159	160
American shad	-	-	-	-	-	-	-	-	-	-
Arrowtooth flounder	463.02	57.04	-	10.60	345.62	62.68	34.37	28.66	1.65	2.66
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	-	-	-	-	-	-	-	-	-
Bigfin eelpout	-	-	-	-	-	2.18	-	1.31	-	-
Black eelpout	-	-	-	-	-	0.17	-	-	0.58	-
Bocaccio	-	-	-	-	-	-	4.81	-	-	3.60
Canary rockfish	2.32	-	4.82	-	1.33	-	10.73	-	-	-
China rockfish	-	-	4.65	-	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-	-	-	-	-
Darkblotched rockfish	0.61	-	-	-	-	9.18	-	7.29	-	-
Dover sole	55.11	57.72	-	3.87	26.07	120.70	24.75	67.22	25.14	3.61
English sole	0.88	-	1.46	0.83	2.30	-	-	-	-	8.30
Eulachon	-	-	-	2.27	0.32	-	-	-	-	-
Flathead sole	-	-	-	0.72	0.33	-	-	-	-	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	1.17	1.53	-	0.20	6.68	-	44.47	-	-	-
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	0.92	-	-	-	-	-	-	-
Lingcod	8.43	8.65	7.92	2.78	7.03	-	0.65	-	-	23.63
Longnose skate	-	-	-	6.61	4.39	0.70	19.49	0.79	3.14	-
Pacific cod	-	21.68	-	-	11.17	-	4.70	-	-	0.36
Pacific hake	-	-	-	-	-	4.80	-	27.60	6.04	1.30
Pacific halibut	-	18.18	-	-	-	-	-	-	-	14.54
Pacific ocean perch	11.63	879.01	-	-	33.43	116.89	4.39	38.37	2.07	-
Pacific sanddab	-	-	1.66	-	-	-	-	-	-	2.64
Petrale sole	0.56	-	0.08	4.68	0.96	-	-	-	-	6.26
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	-	10.63	-	-	0.49	1.64	0.02	17.35	2.27	-
Redstripe rockfish	-	-	-	-	-	-	1344.35	-	-	-
Rex sole	299.78	27.32	-	20.50	29.25	42.39	4.04	42.99	1.87	9.85
Rosethorn rockfish	-	-	-	-	0.62	-	11.77	2.84	-	-
Rougheye rockfish	-	-	-	-	0.62	13.65	-	41.07	3.03	-
Sablefish	91.01	77.27	-	-	41.72	77.16	170.33	50.76	87.04	-
Sandpaper skate	-	-	-	-	-	-	-	0.69	-	-
Sharpchin rockfish	-	535.20	-	-	32.97	-	12.12	-	-	-
Shortraker rockfish	-	-	-	-	-	-	-	-	18.79	4.38
Shortspine thornyhead	-	0.03	-	-	2.72	14.60	-	65.24	22.98	1.40
Silvergray rockfish	18.76	3.63	-	-	5.59	-	106.39	-	-	-
Slender sole	1.61	-	-	2.22	0.41	-	0.07	0.18	-	1.35
Southern rock sole	-	-	1.65	-	-	-	-	-	-	-
Spiny dogfish	19.40	12.34	-	52.78	31.52	2.08	6.88	-	-	1170.97
Splitnose rockfish	-	33.60	-	-	75.20	22.06	-	11.68	-	-
Spotted ratfish	3.88	2.09	6.10	0.36	10.18	0.92	0.16	2.89	1.29	6.41
Threadfin sculpin	-	-	-	-	0.86	-	-	-	-	0.06
Walleye pollock	-	-	-	-	-	-	-	-	-	0.06
Widow rockfish	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	-	2.35	-	-	-	-	5.77	-	-	-
Yellowmouth rockfish	-	24.31	-	-	-	-	-	-	-	-
Yellowtail rockfish	-	-	-	-	2.43	-	55.50	-	-	-
Other	6.54	2.86	0.46	1.79	4.59	0.55	3.89	1.28	16.72	0.47
Total	984.71	1775.44	29.72	110.21	678.80	492.35	1869.65	408.21	192.61	1261.85

Appendix 3: Continued

Species	161	162	163	164	165	166	167	168	169	170
American shad	-	-	-	-	0.23	-	-	-	-	-
Arrowtooth flounder	-	-	0.44	1.31	3.03	0.19	1.83	194.11	29.95	6.21
Bank rockfish	-	-	-	-	-	-	-	-	-	-
Big skate	-	22.37	-	-	-	-	-	-	-	-
Bigfin eelpout	-	-	-	-	-	-	-	-	-	0.24
Black eelpout	-	-	-	-	-	-	-	-	-	-
Bocaccio	-	-	-	-	-	-	-	-	-	-
Canary rockfish	-	-	-	-	-	-	-	187.12	13.27	-
China rockfish	-	-	-	-	-	-	-	-	-	-
Curlfin sole	1.37	0.56	-	-	-	-	-	-	-	-
Darkblotched rockfish	-	-	-	-	-	-	-	-	134.64	16.09
Dover sole	0.99	-	0.52	1.60	2.36	11.99	18.41	9.54	74.80	23.90
English sole	3.46	1.20	60.09	27.70	47.90	2.98	18.51	3.49	-	-
Eulachon	-	-	-	0.05	0.70	-	11.44	-	-	-
Flathead sole	-	-	-	0.30	23.04	-	-	-	-	-
Green sturgeon	-	-	-	-	-	-	-	-	-	-
Greenstriped rockfish	-	-	-	-	-	-	-	15.00	-	-
Grenadiers	-	-	-	-	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-	-	-	-	-
Lingcod	-	21.95	34.47	0.70	-	-	-	19.81	1.84	-
Longnose skate	-	-	4.44	-	8.35	-	8.22	-	12.21	-
Pacific cod	-	-	0.64	-	3.03	0.76	4.19	2.07	-	-
Pacific hake	-	-	-	0.24	-	-	-	0.57	-	11.11
Pacific halibut	10.65	15.10	13.06	11.24	15.38	-	20.00	-	-	-
Pacific ocean perch	-	-	-	-	-	-	-	24.29	540.49	172.02
Pacific sanddab	11.26	5.63	25.42	10.74	13.42	94.95	-	-	-	-
Petrale sole	-	1.42	10.72	8.65	5.46	0.73	-	0.42	-	-
Quillback rockfish	-	-	-	-	-	-	-	-	-	-
Redbanded rockfish	-	-	-	-	-	-	-	-	2.68	2.10
Redstripe rockfish	-	-	-	-	-	-	-	-	-	-
Rex sole	0.23	0.25	39.81	7.81	7.31	66.97	25.28	4.30	-	12.82
Rosethorn rockfish	-	-	-	-	-	-	-	3.06	-	4.70
Rougheye rockfish	-	-	-	-	-	-	-	-	-	0.43
Sablefish	-	-	-	-	-	-	5.14	85.49	-	24.09
Sandpaper skate	-	-	-	-	-	-	-	0.66	-	-
Sharpchin rockfish	-	-	-	-	-	-	-	-	0.62	-
Shortraker rockfish	-	-	-	-	-	-	-	-	-	-
Shortspine thornyhead	-	-	-	-	-	-	-	13.44	-	54.25
Silvergray rockfish	-	-	-	-	-	-	-	9.25	-	-
Slender sole	-	-	0.26	0.19	-	-	-	0.92	-	-
Southern rock sole	2.71	0.58	-	-	-	-	-	-	-	-
Spiny dogfish	-	7.69	205.26	327.54	12.87	37.59	39.28	59.37	0.86	1.19
Splitnose rockfish	-	-	-	-	-	-	-	-	166.85	282.85
Spotted ratfish	-	-	-	-	17.00	2.64	160.74	11.52	-	1.05
Threadfin sculpin	-	-	-	-	-	-	-	0.39	-	-
Walleye pollock	-	-	-	-	0.63	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	35.84	-	3.38
Yelloweye rockfish	-	-	-	-	-	-	-	9.84	-	-
Yellowmouth rockfish	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	-	-	-	-	0.32	-	-	-	-	-
Other	-	1.96	0.20	0.83	2.12	0.56	7.00	2.05	0.51	0.06
Total	30.67	78.71	395.33	398.90	163.15	219.36	320.04	692.55	978.72	616.49

Appendix 3: Continued

Species	171	172	173	174	175	176
American shad	-	-	-	-	-	0.07
Arrowtooth flounder	358.60	927.66	0.92	77.51	40.01	27.75
Bank rockfish	-	-	-	-	-	-
Big skate	-	-	-	-	-	-
Bigfin eelpout	-	-	-	-	-	-
Black eelpout	-	-	-	0.62	-	-
Bocaccio	-	36.75	3.68	-	-	-
Canary rockfish	-	87.78	-	-	-	-
China rockfish	-	-	-	-	-	-
Curlfin sole	-	-	-	-	-	-
Darkblotched rockfish	-	-	-	-	-	-
Dover sole	5.02	10.22	5.80	35.30	9.65	50.76
English sole	-	-	0.27	-	-	-
Eulachon	-	-	-	0.49	0.23	-
Flathead sole	-	-	12.06	12.26	4.57	-
Green sturgeon	-	-	-	-	-	-
Greenstriped rockfish	30.07	119.40	-	-	-	1.61
Grenadiers	-	-	-	-	-	-
Kelp greenling	-	-	-	-	-	-
Lingcod	46.16	38.59	4.07	-	-	67.48
Longnose skate	23.89	-	-	24.68	5.24	11.33
Pacific cod	91.54	12.09	1.43	-	-	38.67
Pacific hake	-	-	-	0.66	0.47	-
Pacific halibut	64.07	-	8.12	-	7.03	23.45
Pacific ocean perch	70.14	29.17	-	-	-	-
Pacific sanddab	-	-	1.38	0.22	-	-
Petrale sole	-	0.86	14.46	0.18	-	9.57
Quillback rockfish	-	-	-	-	-	0.64
Redbanded rockfish	1.35	23.72	-	0.36	-	-
Redstripe rockfish	2.98	0.25	-	-	-	-
Rex sole	0.60	-	20.28	42.90	24.41	3.59
Rosethorn rockfish	8.47	4.30	-	-	-	-
Rougheye rockfish	-	-	-	1.09	1.87	-
Sablefish	-	-	-	42.87	22.40	1.89
Sandpaper skate	-	-	1.03	-	-	-
Sharpchin rockfish	135.15	2.07	-	-	-	-
Shortraker rockfish	-	-	-	-	-	-
Shortspine thornyhead	0.37	0.49	-	4.39	-	-
Silvergray rockfish	17.61	-	-	-	-	-
Slender sole	1.66	0.41	1.35	10.35	5.29	-
Southern rock sole	-	-	0.36	-	-	-
Spiny dogfish	38.42	67.80	676.77	67.66	139.19	977.26
Splitnose rockfish	2.99	0.09	-	0.13	-	-
Spotted ratfish	31.66	156.20	20.71	21.29	5.20	194.31
Threadfin sculpin	-	-	-	-	-	0.81
Walleye pollock	-	-	-	-	-	-
Widow rockfish	7.33	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	-	-
Yellowmouth rockfish	55.58	-	-	-	-	-
Yellowtail rockfish	3.65	75.87	-	-	-	12.94
Other	-	0.58	0.59	19.33	1.80	-
Total	997.31	1594.30	773.28	362.29	267.36	1422.13

Appendix 4: Alphabetical listing of all species captured. Catch weight in kilograms, trace indicates that no single catch of that species was greater than 0.1 kg.

Common name	*Latin name*	Occurrence	Catch (kg)
American shad	*Alosa sapidissima*	18	14.42
Anemone	*Actiniaria*	22	18.97
Anomura	*Anomura*	1	Trace
Arminidae	*Arminidae*	1	Trace
Arrowtooth flounder	*Atheresthes stomias*	135	19640.74
Asteriidae	*Asteriidae*	1	Trace
Aurora rockfish	*Sebastes aurora*	4	4.4
Bank rockfish	*Sebastes rufus*	2	16.28
Basket stars	*Euryalina*	18	4.51
Benthopectinidae	*Benthopectinidae*	1	Trace
Big skate	*Raja binoculata*	12	243.05
Bigeye poacher	*Bathyagonus pentacanthus*	4	0.4
Bigfin eelpout	*Lycodes cortezianus*	17	24.99
Black eelpout	*Lycodes diapterus*	16	8.4
Black rockfish	*Sebastes melanops*	1	1.7
Blackbelly eelpout	*Lycodes pacificus*	44	7.48
Blackfin poacher	*Bathyagonus nigripinnis*	3	Trace
Blackfin sculpin	*Malacocottus kincaidi*	5	0.41
Blacktip poacher	*Xeneretmus latifrons*	7	Trace
Bocaccio	*Sebastes paucispinis*	28	648.03
Box crabs	*Lopholithodes*	1	0.54
Bristly crab	*Acantholithodes hispidus*	1	Trace
Brown box crab	*Lopholithodes foraminatus*	2	0.39
Brown cat shark	*Apristurus brunneus*	3	5.6
Butter sole	*Isopsetta isolepis*	1	0.18
Canary rockfish	*Sebastes pinniger*	49	8911.09
China rockfish	*Sebastes nebulosus*	2	10.87
Chinook salmon	*Oncorhynchus tshawytscha*	2	5.91
Chum salmon	*Oncorhynchus keta*	1	8.98
Coonstripe shrimp	*Pandalus danae*	1	Trace
Copper rockfish	*Sebastes caurinus*	1	5.04
Crangons	*Crangon*	4	Trace
Ctenophora	*Ctenophora*	1	Trace
Curlfin sole	*Pleuronichthys decurrens*	12	10.18
Cushion star	*Pteraster tesselatus*	4	1.55
Darkblotched rockfish	*Sebastes crameri*	38	522.49
Deepsea sole	*Embassichthys bathybius*	1	0.91
Dogwhelks	*Nassariidae*	2	0.02
Dover sole	*Microstomus pacificus*	137	4555.64
Dungeness crab	*Cancer magister*	1	0.68

Appendix 4: Continued

Common name	Latin name	Occurrence	Catch (kg)
Eelpouts	*Zoarcidae*	3	1.53
English sole	*Parophrys vetulus*	107	1482.92
Eulachon	*Thaleichthys pacificus*	33	50.16
Fish-eating star	*Stylasterias forreri*	18	3.48
Flathead sole	*Hippoglossoides elassodon*	49	271.19
Fragile urchin	*Allocentrotus fragilis*	67	264.81
Gastropods	*Gastropoda*	1	Trace
Giant red sea cucumber	*Parastichopus californicus*	7	3.17
Glass shrimp	*Pasiphaea pacifica*	1	0.53
Glass sponges	*Hexactinellida*	6	4.06
Green sturgeon	*Acipenser medirostris*	1	63.5
Greenstriped rockfish	*Sebastes elongatus*	72	1190.48
Grenadiers	*Macrouridae*	1	15.26
Grooved tanner crab	*Chionoecetes tanneri*	1	0.53
Hagfishes	*Myxinidae*	1	0.07
Harlequin rockfish	*Sebastes variegatus*	1	0.3
Heart urchins	*Atelostomata*	21	35.99
Highfin dragonfish	*Bathophilus flemingi*	1	Trace
Inshore tanner crab	*Chionoecetes bairdi*	1	0.34
Jellyfish	*Scyphozoa*	17	13.28
Kelp greenling	*Hexagrammos decagrammus*	7	8.79
Lampshells	*Brachiopoda*	1	Trace
Lanternfishes	*Myctophidae*	1	Trace
Leather star	*Dermasterias imbricata*	1	0.34
Lingcod	*Ophiodon elongatus*	119	2949.77
Long-armed sea star	*Orthasterias koehleri*	1	Trace
Longnose skate	*Raja rhina*	81	1076.78
Longspine thornyhead	*Sebastolobus altivelis*	2	6.28
Mediaster	*Mediaster*	1	Trace
Metridium	*Metridium*	7	10.76
Morning sun starfish	*Solaster dawsoni*	1	Trace
Night smelt	*Spirinchus starksi*	1	0.16
Northern anchovy	*Engraulis mordax mordax*	1	Trace
Northern lampfish	*Stenobrachius leucopsarus*	1	Trace
Northern ronquil	*Ronquilus jordani*	8	0.21
Octopus	*Octopoda*	2	0.24
Oikopleuridae	*Oikopleuridae*	1	Trace
Opalescent inshore squid	*Loligo opalescens*	4	0.21
Ophiuridae	*Ophiuridae*	5	Trace
Oregontriton	*Fusitriton oregonensis*	7	Trace
Pacific bobtail squid	*Rossia pacifica*	9	Trace
Pacific cod	*Gadus macrocephalus*	92	1876.46

Appendix 4: Continued

Common name	*Latin name*	Occurrence	Catch (kg)
Pacific hake	*Merluccius productus*	43	195.13
Pacific halibut	*Hippoglossus stenolepis*	92	1942.08
Pacific herring	*Clupea pallasi*	43	32.57
Pacific ocean perch	*Sebastes alutus*	62	8901
Pacific red octopus	*Octopus rubescens*	1	0.82
Pacific sand lance	*Ammodytes hexapterus*	4	1.25
Pacific sanddab	*Citharichthys sordidus*	59	1063.18
Pacific sardine	*Sardinops sagax*	5	0.72
Pacific tomcod	*Microgadus proximus*	2	Trace
Pacific viperfish	*Chauliodus macouni*	2	0.04
Pallid slipskin	*Lycodapus mandibularis*	1	Trace
Pallid urchin	*Strongylocentrotus pallidus*	7	1.83
Pandalid shrimp	*Pandalidae*	1	Trace
Peanutworms	*Sipuncula*	1	Trace
Petrale sole	*Eopsetta jordani*	97	425.99
Pile perch	*Rhacochilus vacca*	5	2.76
Pink scallop	*Chlamys rubida*	1	0.13
Pink shrimp (smooth)	*Pandalus jordani*	26	13.45
Pinpoint lampfish	*Nannobrachium regale*	8	0.05
Poachers	*Agonidae*	3	0.2
Prawn	*Pandalus platyceros*	29	8.42
Pterasteridae	*Pterasteridae*	1	Trace
Pygmy rockfish	*Sebastes wilsoni*	7	4.39
Quillback rockfish	*Sebastes maliger*	8	44.67
Quillfish	*Ptilichthys goodei*	1	Trace
Redbanded rockfish	*Sebastes babcocki*	50	356.57
Redstripe rockfish	*Sebastes proriger*	33	2394.82
Rex sole	*Glyptocephalus zachirus*	150	3323.95
Rockfishes	*Sebastinae*	2	2.2
Rose starfish	*Crossaster papposus*	3	Trace
Rosethorn rockfish	*Sebastes helvomaculatus*	38	133.67
Rougheye rockfish	*Sebastes aleutianus*	36	1288.86
Sablefish	*Anoplopoma fimbria*	82	4835.16
Salpidae	*Salpidae*	6	0.1
Sand star	*Luidia foliolata*	26	18.68
Sandpaper skate	*Bathyraja interrupta*	18	26.49
Scallop	*Pectinidae*	1	Trace
Schoolmaster gonate squid	*Berryteuthis magister*	10	16.91
Sea cucumber	*Holothuroidea*	24	6.24
Sea mouse	*Aphrodita*	3	Trace
Sea pens	*Pennatulacea*	1	Trace
Sea whip	*Osteocella septentrionalis*	5	0.81

Appendix 4: Continued

Common name	Latin name	Occurrence	Catch (kg)
Sharpchin rockfish	*Sebastes zacentrus*	47	3425.66
Shiner perch	*Cymatogaster aggregata*	11	0.49
Shining tubeshoulder	*Sagamichthys abei*	1	Trace
Shortbelly rockfish	*Sebastes jordani*	5	14.45
Shortraker rockfish	*Sebastes borealis*	14	219.89
Shortspine thornyhead	*Sebastolobus alascanus*	43	791.24
Sidestripe shrimp	*Pandalopsis dispar*	19	2.61
Silvergray rockfish	*Sebastes brevispinis*	42	1443.41
Slender sole	*Lyopsetta exilis*	94	143.13
Slim sculpin	*Radulinus asprellus*	2	Trace
Smelts	*Osmeridae*	1	0.05
Smootheye poacher	*Xeneretmus leiops*	3	0.04
Snailfishes	*Liparinae*	2	Trace
Snake prickleback	*Lumpenus sagitta*	1	Trace
Solasteridae	*Solasteridae*	3	3.59
Southern rock sole	*Lepidopsetta bilineata*	26	74.68
Spider crabs	*Majidae*	3	Trace
Spike shrimp (horned shrimp)	*Paracrangon echinata*	1	Trace
Spiny dogfish	*Squalus acanthias*	140	29468.54
Spiny red sea star	*Hippasteria spinosa*	9	4.33
Spiny scallop	*Chlamys hastata*	1	Trace
Splitnose rockfish	*Sebastes diploproa*	40	4604.2
Sponges	*Porifera*	6	8.21
Spotted ratfish	*Hydrolagus colliei*	133	2263.91
Squids	*Teuthoidea*	2	Trace
Starfish	*Asteroidea*	23	2.43
Stripetail rockfish	*Sebastes saxicola*	4	7.33
Sturgeon poacher	*Podothecus accipenserinus*	1	Trace
Sunflower starfish	*Pycnopodia helianthoides*	9	3.99
Surf smelt	*Hypomesus pretiosus*	1	Trace
Tanner crabs	*Chionoecetes*	4	19.82
Threadfin sculpin	*Icelinus filamentosus*	29	8.85
Tubeshoulders	*Platytroctidae*	1	Trace
Twoline eelpout	*Bothrocara brunneum*	1	0.53
Vermillion starfish	*Mediaster aequalis*	3	0.08
Walleye pollock	*Theragra chalcogramma*	17	32.93
White sea cucumber	*Eupentacta quinquesemita*	1	Trace
Whitebarred prickleback	*Poroclinus rothrocki*	9	Trace
Whitespotted sea cucumber	*Parastichopus leukothele*	14	9.87
Widow rockfish	*Sebastes entomelas*	12	54.93
Yelloweye rockfish	*Sebastes ruberrimus*	17	153.22
Yellowmouth rockfish	*Sebastes reedi*	9	475.04
Yellowtail rockfish	*Sebastes flavidus*	47	6041.09

Appendix 5: Average sensor data by tow for usable tows.

Set	GPS			SBE 21		Simrad ITI				BCS	CTD				SBE 39	
	Direction (° True)	Latitude (° N)	Longitude (° W)	Surface Salinity (‰)	Surface Temperature (° C)	Net Depth (m)	Net Width (m)	Trawl Height (m)	Temp (° C)	Tilt Angle	Dissolved Oxygen (mg/l)	Depth (m)	Salinity (‰)	Temp (° C)	Depth (m)	Temp (° C)
1	344.8	48.6139	125.0468	31.6	11.1		13.2			29.0	3.4	77.6	33.4	7.5	76.5	7.5
2	322.0	48.6340	125.0473	31.6	11.0		13.3			35.8	4.1	72.5	33.3	7.8	72.1	7.8
3										21.7	3.1	88.3	33.6	7.3	88.0	7.3
4	274.4	48.6001	125.1502	31.6	11.2	101.4	61.1	4.1	6.7	23.9	2.7	105.2	33.7	7.0	104.8	7.0
5	99.1	48.2211	125.8203	31.6	11.9	436.8	60.8	4.5	5.4	23.5	1.3	475.7	34.1	5.4	474.5	5.4
6	232.6	48.2595	125.7702	31.6	11.9	925.8	9.8	1.8	6.5	30.1	2.5	191.3	34.0	6.7	191.0	6.7
7	241.3	48.3229	125.6243	31.6	11.8	134.0	41.4	3.3	6.6	40.7	2.3	138.5	33.9	6.9	137.7	6.9
8	112.2	48.4030	125.6373	31.3	12.0	694.7	44.6	3.5	6.6	48.1	2.3	132.2	33.9	6.7	132.0	6.7
9	241.1	48.4535	125.4998	31.4	12.1	138.5	59.2	4.0	6.5	21.8	2.2	143.2	33.9	6.7	142.9	6.7
10	92.0	48.4335	125.5170	31.4	12.1	154.6	18.6	4.4	6.7	42.2	2.2	124.7	33.9	6.7	124.1	6.7
11	320.5	48.6879	125.2399	31.5	11.8	38.4	55.3	4.2	8.7	22.4	4.6	87.7	33.0	8.0	87.7	8.0
12	262.5	48.6486	125.1751	31.5	12.0	87.1	55.4	3.7	7.0	16.3	4.5	91.2	33.1	7.9	90.9	7.9
13	114.3	48.6622	125.1909	31.5	12.0	95.9	47.2		0.0	18.0	4.5	86.1	33.1	8.0	85.8	8.0
14	307.0	48.5885	125.1172	31.5	13.2	157.4	55.5	3.5	4.5	23.9	3.1	110.2	33.6	7.3	109.2	7.3
15	198.2	48.5307	125.3933	31.7	12.2	163.0	5.8	3.7	7.4	26.9	2.6	95.9	33.7	7.1	95.3	7.1
16	69.5	48.4698	125.3270	31.6	12.4	155.0	56.3	3.1	6.5	24.0	2.2	158.9	33.9	6.7	158.7	6.7
17	50.1	48.4292	125.4246	31.6	11.7	193.9	45.4	3.4	6.5	25.0	2.1	151.5	33.9	6.6	151.4	6.6
18	239.4	48.3562	125.5750	31.4	12.5	140.7	61.9	3.1	6.5	12.9	2.1	144.3	33.9	6.7	144.1	6.7
19	79.0	48.3216	125.5626	31.4	12.5	134.5	62.0	4.1	6.7	15.2	2.4	137.2	33.9	7.0	137.0	7.0
20										30.2	2.2	159.7	33.9	6.8	159.1	6.8
21	175.0	48.4423	126.1611	31.7	12.6	338.1	63.6	5.4	5.8	79.6	1.9	361.2	34.0	5.9	360.6	5.9
22	177.2	48.4558	126.1438	31.7	12.5	252.6	68.7	3.7	6.3	58.6	2.3	256.0	34.0	6.4	255.3	6.5
23	96.4	48.3558	126.0942	31.6	12.3	403.9	63.4	2.9	5.3	21.1	1.3	436.3	34.1	5.3	434.9	5.3
24	254.0	48.3973	126.0015	31.6	12.4	386.3	37.9	3.5	6.6	22.7	2.4	217.5	33.9	6.7	217.5	6.7
25	193.8	48.3938	125.9854	31.6	12.3	265.9	68.8	2.5	5.5	23.0	2.2	286.7	34.0	6.4	286.3	6.4
26	121.9	48.4847	125.9348	31.6	12.3	121.4	58.6	2.9	7.0	20.6					125.7	7.0
27	243.6	48.3279	125.8784	31.6	12.2	154.5	58.0	1.3	-0.1	33.1	2.2	293.0	34.0	6.3	292.6	6.3
28	262.4	48.3364	125.9088	31.6	12.2	285.9	61.8	6.6	-0.2	35.0	1.9	342.0	34.0	6.0	342.2	6.0
29	240.1	48.3681	125.8102	31.7	12.6	131.5	53.5	3.6	6.8	16.7	2.6	145.4	33.9	7.0	144.9	7.0

Appendix 5: Continued

Appendix 5: Continued

Set	GPS			SBE 21		Simrad ITI				BCS	CTD				SBE 39	
	Direction (° True)	Latitude (° N)	Longitude (° W)	Surface Salinity (‰)	Surface Temperature (° C)	Net Depth (m)	Net Width (m)	Trawl Height (m)	Temp (° C)	Tilt Angle	Dissolved Oxygen (mg/l)	Depth (m)	Salinity (‰)	Temp (° C)	Depth (m)	Temp (° C)
30	268.5	48.4410	125.6456	31.4	12.2	111.5	56.5	4.6	7.8	18.6	2.9	115.6	33.6	7.4	113.8	7.4
31	21.1	48.5592	125.5610	31.6	12.8	135.7	57.5	6.5	8.0	18.2	3.0	97.6	33.5	7.5	96.8	7.5
32	246.7	48.6785	125.6578	31.5	12.4	212.0	49.0	3.3	8.3	18.6	5.1	93.1	33.1	8.2	92.9	8.2
33	296.8	48.6875	125.7362	31.6	12.6	132.2	54.1	4.0	8.1	25.1	4.4	139.4	33.2	8.1	138.3	8.1
34	104.7	48.5042	125.7210	31.5	12.7	123.6	54.8	3.8	7.9	16.8	3.3	93.0	33.5	7.6	91.6	7.6
35	256.9	48.7622	125.6103	31.3	12.6	160.1	62.6	3.6	1.7	20.4	4.5	164.2	33.2	8.1	164.0	8.1
36	248.8	48.7566	125.6514	31.4	12.6	174.9	65.6	3.4	8.1	29.6	4.5	167.2	33.2	8.1	162.1	8.1
37	242.9	48.7428	125.6889	31.5	12.7	174.1	67.1	3.4	6.1	23.1	4.4	179.0	33.2	8.1	177.1	8.1
38	84.6	48.7376	125.7987	31.3	12.6	107.0	57.5	3.6	8.0	15.2					110.7	8.2
39	50.0	48.7536	125.8688	31.3	12.7	100.1	30.2	3.6	8.6	19.7					67.6	8.3
40	250.9	48.7732	125.8663	31.3	12.6	186.5	9.9	3.1	8.8	14.5					64.8	8.3
41	60.5	48.7837	125.8182	31.4	12.7	284.0	2.2	1.2	8.5	17.9					59.8	8.4
42	35.2	48.8358	125.7571	31.5	12.6	156.3	22.0	1.5	8.8	20.4					50.9	8.6
43	281.9	48.9070	125.6479	31.4	12.3	99.9	51.5	3.8	8.7	14.6	6.4	79.9	32.4	9.0	79.8	9.0
44	312.9	48.9217	125.7933	31.4	12.5	73.9	34.9	3.9	8.0	18.2	6.0	78.0	32.6	8.9	77.6	8.9
45	231.9	48.8767	125.8280	31.4	12.4	48.2	1.3	3.8	8.7	12.5	6.4	52.1	32.4	9.0	51.9	9.0
46	186.4	48.8208	125.8636	31.4	12.6	143.3	2.4	2.2	8.8	23.6	5.5	55.4	32.8	8.5	55.2	8.5
47	307.2	48.4865	126.1372	31.7	12.9	838.7	61.9	2.8	7.0	18.4	2.4	212.2	33.9	6.7	210.2	6.7
48	218.7	48.5775	126.1947	31.7	12.8	495.4	62.4	4.5	5.3	55.9	1.1	505.9	34.1	5.1	497.6	5.1
49	329.7	48.6380	126.1930	31.8	12.5	196.8	65.5	3.2	7.0	17.5	2.4	202.9	33.9	6.8	201.7	6.8
50	329.2	48.6268	125.9687	31.7	12.6	99.0	57.7	3.6	7.9	14.8	3.4	103.0	33.5	7.6	102.6	7.6
51	332.2	48.6858	126.0886	31.8	12.6	118.1	63.8	3.7	7.4	11.2	2.9	122.0	33.6	7.4	121.7	7.4
52	331.5	48.7157	126.0383			89.0	60.5	4.3	7.9	14.2	4.0	103.1	33.4	7.8	102.7	7.8
53	339.3	48.7405	126.0165	31.7	12.7	85.7	59.4	3.6	8.2	10.5	5.1	89.2	33.1	8.2	89.0	8.2
54	307.9	48.8000	126.1405	31.8	12.6	111.6	66.7	3.6	7.5	11.7	3.0	115.7	33.6	7.5	115.4	7.5
55	307.9	49.0045	126.1037	31.8	12.4	59.0	56.0	4.0	8.9	18.2	5.8	61.2	32.8	8.6	58.8	8.6
56	325.9	49.0751	125.3233	31.9	12.6	55.9	55.1	4.1	8.6	12.3	6.1	59.5	32.7	8.6	58.7	8.6
57	295.5	49.0667	126.2931	31.7	12.5	84.3	58.0	4.2	8.0	13.8	4.2	91.4	33.4	8.0	89.2	8.0
58	165.6	48.9983	126.3620	31.9	12.4	127.7	66.1	3.6	7.3	12.1	2.9	132.2	33.8	7.4	131.9	7.4
59	139.9	48.9438	126.2971	31.8	12.1	124.6	65.5	3.9	7.5	12.3	2.9	128.8	33.7	7.4	128.3	7.4
60	311.9	48.9250	126.3473	32.0	12.7	139.7	67.5	3.6	7.2	7.7	2.7	143.6	33.8	7.3	143.3	7.3

Appendix 5: Continued

Set	GPS			SBE 21		Simrad ITI				BCS	CTD				SBE 39	
	Direction (° True)	Latitude (° N)	Longitude (° W)	Surface Salinity (‰)	Surface Temperature (° C)	Net Depth (m)	Net Width (m)	Trawl Height (m)	Temp (° C)	Tilt Angle	Dissolved Oxygen (mg/l)	Depth (m)	Salinity (‰)	Temp (° C)	Depth (m)	Temp (° C)
61	312.5	48.9587	126.4230	32.0	12.6	148.6	68.0	3.7	7.0	12.9	3.0	152.5	33.8	7.1	152.1	7.1
62	151.0	48.9241	124.3305	32.0	12.8	153.0	64.0	3.8	7.1	16.4	3.0	157.6	33.9	7.1	156.4	7.1
63	137.1	48.8841	126.3570	32.0	12.8	153.6	67.1	3.7	7.2	15.3	2.6	157.7	33.8	7.1	157.3	7.1
64	190.1	48.8839	126.1475	31.8	12.1	93.9	62.4	3.8	7.8	9.1	3.7	97.9	33.5	7.7	97.8	7.7
65	182.5	48.8646	126.1103	31.8	12.4	87.1	58.5	4.3	7.8	12.9	4.4	90.9	33.3	7.9	89.9	7.9
66	196.8	48.8083	126.1619	32.0	12.7	115.9	68.9	4.0	7.4	10.2	2.7	120.3	33.7	7.3	119.6	7.3
67	169.6	48.7775	126.2576	31.9	12.6	155.2	69.3	4.0	6.9	10.1	2.9	159.5	33.9	7.0	159.3	7.0
68	239.8	48.7502	125.3975	32.0	12.7	462.4	65.8	3.7	5.4	18.5	1.3	460.5	34.1	5.3	456.0	5.3
69	289.3	48.7857	126.5789	31.8	13.0	430.5	69.9	3.7	5.1	11.2	1.3	433.0	34.1	5.3	434.9	5.2
70	170.6	48.8565	126.5168	31.9	12.9	204.2	63.7	8.5	6.9	17.3	2.9	210.2	33.9	7.0	206.6	7.0
71	122.6	48.8066	126.4155	32.0	12.7	371.0	61.7	2.9	6.8	11.9	2.6	212.7	33.9	6.8	212.9	6.8
72	321.9	48.8264	126.3214	31.9	12.7	163.5	69.1	3.7	7.1	11.0	2.8	168.2	33.9	7.0	168.1	7.0
73	150.1	48.8174	126.3208	31.9	12.7	167.6	70.2	3.5	6.9	8.6	2.8	171.5	33.9	7.0	171.7	7.0
74	310.2	48.9471	126.5353	31.8	12.8	303.7	60.1	6.2	6.8	38.9					230.4	6.8
75	315.3	48.8743	126.4020	32.0	12.6	161.7	67.1	3.6	7.1	19.8	3.0	165.8	33.8	7.0	165.0	7.0
76	336.7	48.9759	126.4756	32.0	12.7	189.0	61.4	3.4	7.3	19.5	2.8	157.0	33.9	6.9	155.6	6.9
77	326.4	49.0278	126.3485	32.0	12.4	118.1	64.5	3.9	7.7	15.2	2.9	122.3	33.8	7.5	121.5	7.5
78	305.7	49.0656	126.3179	31.8	12.1	96.1	64.5	4.6	7.8	14.6					99.2	7.9
79	119.9	49.1784	126.2356	31.6	12.8	46.1	50.5	4.0	9.4	13.7	6.7	50.8	32.4	9.3	49.3	9.4
80	271.3	49.0662	126.4544	31.9	12.7	127.7	69.0	3.8	7.4	16.4	3.1	131.7	33.7	7.6	131.1	7.6
81	275.1	49.0162	126.5933	32.0	12.6	372.9	57.5	3.2	6.9	18.2	2.9	172.3	33.9	7.0	171.7	7.0
82	96.6	48.9947	126.6481	32.0	12.7	224.8	62.4	4.2	6.8	9.8	2.6	229.5	33.9	6.9	227.5	6.9
83	299.1	48.9924	126.7842	32.1	12.7	375.5	68.7	4.9	5.7	11.3	1.5	379.4	34.0	5.6	379.1	5.6
84	123.3	49.0114	126.7704	32.0	12.8	273.4	66.6	3.6	6.2	12.8	2.0	276.9	34.0	6.2	276.4	6.2
85	123.5	49.0035	126.7278	32.0	12.9	241.1	62.6	3.7	6.5	15.9	2.5	242.7	34.0	6.8	242.4	6.8
86	137.4	49.0199	126.7326	32.0	13.0	200.5	65.7	2.9	6.8	15.2	2.5	204.8	33.9	6.9	204.4	6.9
87	81.7	49.0850	126.5732	31.9	13.1	128.4	67.4	3.6	7.4	16.1	3.1	132.6	33.7	7.5	132.4	7.5
88	159.9	49.0844	126.8472	32.1	12.7		65.5	10.8	6.7	19.2	2.5	214.8	34.0	6.7	213.3	6.7
89	266.5	49.1239	126.7550	32.1	12.6		66.2	5.2	7.1	11.3	3.5	142.7	33.8	7.3	142.1	7.3
90	135.3	49.0896	125.6532	32.1	12.7		66.6	3.6	7.1	11.2	3.1	147.4	33.8	7.2	147.3	7.2
91	108.4	49.0875	126.5258	31.9	13.1		67.8	3.6	7.5	12.4	3.4	132.4	33.7	7.5	132.1	7.5

Appendix 5: Continued

Set	GPS			SBE 21		Simrad ITI				BCS	CTD				SBE 39	
	Direction (° True)	Latitude (° N)	Longitude (° W)	Surface Salinity (‰)	Surface Temperature (° C)	Net Depth (m)	Net Width (m)	Trawl Height (m)	Temp (° C)	Tilt Angle	Dissolved Oxygen (mg/l)	Depth (m)	Salinity (‰)	Temp (° C)	Depth (m)	Temp (° C)
123	155.4	50.5067	128.5702	31.7	11.9		56.8			84.2	2.0	368.9	34.0	5.5	363.5	5.5
124	322.6	50.5183	128.3944	31.5	11.4	162.2	66.3	3.6	6.7	11.2	3.6	166.3	33.8	6.7	166.4	6.7
125	322.9	50.4251	128.2170	31.6	11.6	120.7	59.3	3.7	7.6	10.7	3.5	124.5	33.8	6.8	124.4	6.8
126	12.2	50.3658	128.0688	31.3	12.6	70.6	18.2	4.1	8.3	16.2	4.3	74.6	33.5	7.5	74.7	7.5
127	146.6	50.1226	128.0047	31.2	12.3	107.0	51.8	3.9	6.6	17.7	2.9	110.7	33.9	6.4	110.8	6.4
128	301.3	49.9608	127.8556	31.3	12.3	270.8	61.5	3.7	6.0	45.3	2.2	273.9	34.0	6.0	273.5	6.0
129	299.5	49.9670	127.6352	30.5	13.3	79.7	60.8	3.7	7.1	10.8	3.2	83.8	33.8	7.0	84.0	7.0
130	152.3	49.8575	127.6826	31.6	12.2	169.5	68.4	3.5	6.1	18.8	2.4	173.7	34.0	6.1	173.6	6.1
131	264.5	49.8103	127.6513	31.7	12.5	168.0	63.9	3.7	6.7	19.2	2.6	171.9	33.9	6.5	172.0	6.5
132	168.1	49.8289	127.6023	31.5	13.1	96.6	65.0	4.0	7.7	56.4	3.0	100.2	33.8	6.9	99.9	6.9
133	312.4	50.0700	127.9892	31.5	12.4	186.2	69.3	3.7	6.6	31.3					189.9	6.3
134	74.5	49.6893	127.3341	31.7	13.0					16.4	2.6	142.0	33.9	6.6	141.6	6.6
135	229.9	49.6370	127.3396	31.6	13.4					18.4					150.8	6.4
136	342.3	49.5491	127.1726	31.7	13.0					13.0	2.4	151.2	34.0	6.4	142.2	6.8
137	165.8	49.4603	127.1838	31.6	13.6					10.1	2.9	142.3	33.9	6.8	160.2	6.6
138				31.7	13.9					19.1	2.5	160.3	34.0	6.6	261.8	6.7
139				30.9	14.4					10.5	6.4	51.4	32.7	8.6	52.2	8.6
140	156.3	49.4901	126.9633							10.9	2.7	110.0	33.8	7.3	110.2	7.3
141	338.9	49.5876	127.0524							13.0	2.9	109.0	33.8	7.1	108.9	7.2
142	145.3	49.3475	127.1622							13.7	2.5	185.1	33.9	6.8	185.9	6.8
143	324.8	49.3189	127.1852							13.2	1.9	292.5	34.0	6.3	293.8	6.3
144	133.8	49.2960	127.1701							15.5	1.4	425.4	34.1	5.5	423.7	5.5
145	139.9	49.2754	127.0439	31.6	14.0					13.8	2.5	176.3	33.9	6.9	177.0	6.9
146	128.2	49.2453	126.9904	31.7	14.2	174.8	64.2	3.5	6.9	14.7	2.6	178.6	33.9	7.0	178.3	7.0
147	137.9	49.3085	126.9092	31.6	14.4	144.4	64.9	3.8	7.0	15.4	2.8	148.3	33.9	7.0	149.0	7.0
148	318.5	49.3086	126.7124	31.2	14.2					15.4					108.9	7.3
149	306.6	49.2231	126.9798	31.6	13.1	186.5	66.3	3.4	6.8	15.4	2.4	190.5	34.0	6.9	190.3	6.9
150	147.4	49.1791	126.8900	31.7	13.6	166.8	67.5	3.4	6.9	14.8	2.3	170.8	34.0	6.8	170.7	6.8
151	324.0	49.1695	126.9221	31.7	13.7	195.2	67.0	3.4	6.6	10.6	2.0	199.4	34.0	6.4	199.2	6.4
152	145.9	49.0466	126.8117	31.8	13.7	222.0	67.3	3.5	6.6	10.8	2.0	226.3	34.0	6.4	226.2	6.4
153	311.2	49.2706	126.4547	31.2	15.0	60.2	59.4	3.8	9.3	11.6	6.0	64.1	32.3	9.2	64.1	9.2

Appendix 5: Continued

Set	GPS			SBE 21		Simrad ITI				BCS	CTD				SBE 39	
	Direction (° True)	Latitude (° N)	Longitude (° W)	Surface Salinity (‰)	Surface Temperature (° C)	Net Depth (m)	Net Width (m)	Trawl Height (m)	Temp (° C)	Tilt Angle	Dissolved Oxygen (mg/l)	Depth (m)	Salinity (‰)	Temp (° C)	Depth (m)	Temp (° C)
154	154.9	49.0877	126.4856	**31.5**	**13.9**	123.1	68.7	3.9	7.4	**11.5**	3.3	127.2	33.8	7.2	**127.2**	**7.2**
155	114.3	48.9979	126.6206	**31.9**	**13.9**	195.1	51.4	3.8	6.9	**8.6**	2.6	199.3	34.0	7.0	**198.0**	**7.0**
156	283.3	48.9810	126.7095	**31.8**	**13.6**	319.7	66.9	3.5	5.5	**11.9**	1.5	324.0	34.0	5.6	**323.5**	**5.6**
157	280.3	48.8687	126.4467	**31.7**	**14.1**	166.6	65.8	3.6	7.0	**14.4**	2.4	170.7	34.0	6.9	**170.7**	**6.9**
158	73.4	48.7739	126.4311	**31.9**	**14.0**					**12.0**	1.7	332.6	34.0	5.9	**332.0**	**5.9**
159	127.2	48.7308	126.5009	**32.0**	**14.2**					**12.0**	1.3	480.9	34.1	5.3	**480.7**	**5.3**
160	334.5	48.8465	126.1690	**31.4**	**14.2**	112.5	66.2	3.7	7.5		2.8	116.2	33.7	7.4	**116.4**	**7.4**
161	139.7	49.0426	126.0856	**31.1**	**13.5**	52.2	54.0	3.8	9.1		6.2	56.1	32.4	9.2	**56.1**	**9.2**
162	125.5	49.0483	126.2100	**31.2**	**13.4**	70.6	60.0	3.5	8.4	**13.5**	5.3	74.4	32.8	8.4	**74.5**	**8.4**
163	317.2	49.0301	126.2636	**31.6**	**14.1**	89.6	65.0	3.3	7.6	**12.4**	2.9	95.9	33.6	7.6	**95.9**	**7.6**
164	169.2	49.0195	124.8276	**31.6**	**14.1**	104.8	68.8	3.5	7.6	**16.1**	2.8	109.0	33.7	7.5	**108.9**	**7.5**
165	75.5	48.9404	125.7282	**30.7**	**14.0**	140.6	65.3	3.6	8.8	**29.9**	4.9	91.7	32.7	8.6	**91.7**	**8.6**
166	98.7	48.7743	125.6961	**30.5**	**14.3**	132.3	60.8	3.8	8.6	**11.2**	4.4	101.4	32.9	8.3	**101.1**	**8.3**
167	231.7	48.7249	125.7184	**30.7**	**13.3**	205.3	71.8	3.5	8.1	**19.2**	3.9	208.9	33.1	8.1	**208.1**	**8.1**
168	299.9	48.4795	125.9857	**31.9**	**14.1**	140.4	64.7	3.8	7.2	**18.8**	2.2	143.9	33.9	7.0	**143.6**	**7.0**
169	307.2	48.4374	126.1509	**32.0**	**14.3**	281.8	69.0	3.5	6.6	**10.8**	2.2	288.9	34.0	6.6	**288.1**	**6.6**
170	139.6	48.4806	126.1808	**32.0**	**14.4**	332.2	69.5	3.6	6.2	**12.0**					**335.1**	**6.3**
171	229.0	48.3004	125.9058	**31.9**	**14.7**	579.6	18.1	3.9	6.7	**10.5**	2.4	226.1	34.0	6.6	**225.2**	**6.6**
172	36.5	48.2790	125.7108	**31.8**	**14.8**	691.1	6.0	10.8	7.0	**31.8**					**208.7**	**6.7**
173	238.5	48.6618	125.2980	**31.0**	**13.7**		68.6	3.6	7.6	**11.1**	2.9	102.9	33.6	7.5	**102.5**	**7.5**
174	310.1	48.4228	125.2727	**31.7**	**11.8**		70.7	3.4	6.8	**21.2**	2.1	176.2	33.9	6.9	**175.9**	**6.9**
175	93.9	48.4501	125.1571	**31.4**	**12.3**		65.6	1.2	7.0	**18.0**	2.1	152.8	33.9	7.0	**152.3**	**7.0**
176	85.9	48.5367	124.8516	**31.0**	**13.6**		42.0	3.7	7.1	**13.2**	2.4	123.2	33.8	7.2	**122.4**	**7.2**

Appendix 5: Continued

Set	GPS			SBE 21		Simrad ITI				BCS	CTD				SBE 39	
	Direction (° True)	Latitude (° N)	Longitude (° W)	Surface Salinity (‰)	Surface Temperature (° C)	Net Depth (m)	Net Width (m)	Trawl Height (m)	Temp (° C)	Tilt Angle	Dissolved Oxygen (mg/l)	Depth (m)	Salinity (‰)	Temp (° C)	Depth (m)	Temp (° C)
92	321.6	49.1450	126.3914	32.0	13.5		63.2	7.7	8.3	13.8	4.8	94.2	33.2	8.1	93.9	8.1
93	320.2	49.1949	126.4176	31.9	12.9		58.8	3.6	8.0	11.8	4.9	84.6	33.2	8.1	84.3	8.1
94	260.7	49.1863	126.6006	32.1	13.1		66.6	3.3	8.7	9.6	3.5	117.7	33.7	7.6	117.6	7.6
95	129.7	49.2134	126.5366	31.8	12.6		62.7	3.9	7.9	13.1	3.8	104.7	33.5	7.8	104.2	7.8
96	121.5	49.2200	126.4534	31.6	12.7	135.1	60.3	3.7	8.2	9.6	5.2	84.4	33.1	8.2	84.2	8.2
97	188.6	49.1979	125.7413	32.0	13.0	131.4	66.5	3.7	7.3	9.8	3.6	135.6	33.8	7.2	135.6	7.2
98	320.4	49.1515	126.8944	31.8	13.2	185.4	66.9	3.3	6.9	10.5	2.6	189.8	33.9	7.0	189.7	7.0
99	333.8	49.2053	126.8987	31.9	13.3	159.4	66.1	3.5	7.1	10.6	2.9	163.9	33.9	7.0	163.7	7.0
100	173.8	49.2772	126.9173	31.9	13.2	144.4	69.5	3.6	7.2	13.3	2.9	148.6	33.8	7.1	148.6	7.1
101	288.7	49.2626	127.0341	31.9	13.2	169.2	65.7	3.5	7.0	10.9	2.8	173.5	33.9	7.0	173.3	7.0
102	307.6	49.2707	127.1319	32.0	13.3	321.5	68.5	3.4	6.5	16.6	1.9	329.3	34.0	6.1	328.0	6.2
103	328.4	49.3648	126.7964	31.5	13.4	101.5	60.8	4.0	7.7	13.9	3.6	106.1	33.6	7.7	105.8	7.7
104	321.2	49.3383	127.2139	31.8	12.7	364.8	67.6	3.5	5.9	16.0	1.6	368.3	34.0	5.7	366.9	5.7
105	342.7	49.3822	125.3224	31.8	12.7	400.6	68.7	3.6	5.9	21.2	1.5	404.7	34.0	5.6	403.9	5.6
106	329.0	49.3944	127.2537	31.8	12.8	286.2	66.1	3.4	6.2	13.5	2.2	277.1	34.0	6.5	291.6	6.2
107	332.3	49.4983	127.2592	31.9	13.5	154.6	62.2	3.5	7.3	15.8	2.8	158.7	33.9	6.9	160.0	6.9
108	138.2	49.4419	127.0225	31.9	13.2	128.9	67.1	3.6	7.4	14.1	2.9	132.7	33.8	7.3	132.3	7.3
109	342.3	49.3386	127.0190	31.8	13.9	137.5	66.7	3.5	7.4	12.3	3.1	141.4	33.8	7.1	141.0	7.1
110	316.7	49.3933	126.7438	30.6	14.1	71.3	58.1	4.1	9.7	22.3	6.1	75.4	32.9	8.3	73.5	8.4
111	290.1	49.6475	127.3890	32.0	12.7	327.3	48.2	4.5	6.3	68.4	2.1	298.9	34.0	6.0	297.4	6.0
112	153.9	49.5668	127.2661	31.8	12.9	163.1	64.9	3.5	6.6	15.0	2.5	171.0	33.9	6.6	170.8	6.5
113	334.1	49.5574	127.3328	31.5	13.7	132.1	66.6	3.7	7.2	12.7	2.8	136.1	33.8	7.2	136.2	7.2
114	328.0	49.6204	127.3053	31.2	14.1	128.9	66.0	3.6	6.9	12.1	3.3	132.9	33.8	7.1	132.7	7.1
115	181.3	49.6259	127.1713	30.8	14.4	120.1	66.4	3.8	7.3	12.8	2.9	124.3	33.8	7.3	124.3	7.3
116	93.8	49.9213	127.5020	30.5	13.3	387.5	2.4	3.9	9.5	14.7	6.2	66.1	32.7	8.5	64.4	8.5
117	270.4	50.0207	125.6159	30.6	12.8	146.8	64.1	3.5	6.8	12.3	3.1	151.1	33.9	6.6	148.8	6.6
118	320.0	50.3735	128.4747	31.4	12.4	368.9	67.4	3.3	6.0	23.4	1.8	374.6	34.0	5.3		
119	134.9	50.3685	127.3121	31.5	12.3	1530.3	49.6		6.6	13.1	3.0	224.9	33.9	6.4		
120	150.4	50.4014	128.2413	31.7	11.6	889.5	7.2	38.3	6.8	17.4	3.5	155.8	33.9	6.7		
121	103.2	50.3446	128.4078	31.6	12.1	312.5	66.2	3.2	5.7	14.7	2.3	318.0	34.0	5.8	317.8	5.8
122	314.9	50.4418	128.5050	31.7	11.5	340.5	12.5	86.2	6.2	35.9	3.0	220.7	33.9	6.2	220.7	6.2